GENETIC PSYCHOLOGY MONOGRAPHS

Child Behavior, Animal Behavior, and Comparative Psychology

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Child Behavior, Animal Behavior, and Comparative Psychology

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FEBRUARY, 1938

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THE RELATIONSHIP BETWEEN CHARACTERISTICS OF PERSONALITY AND PHYSIQUE IN ADOLESCENTS

By P. S. de Q. Cabot

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THE RELATIONSHIP BETWEEN CHARACTERISTICS OF PERSONALITY AND PHYSIQUE IN ADOLESCENTS*

P. S. de Q. Cabot

The Psychological Laboratory, Harvard University, Cambridge, Massachusetts

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I. INTRODUCTION: A SURVEY OF OTHER INVESTIGATIONS CONCERNED WITH CONSTITUTIONAL TYPES

> Ante omnia scire convenit naturam corporis, quia alii graciles, alii obesi sunt; alii calidi, alii frigidiores; alii humidi, alii sicciores; alios adstrict, alios resoluta alvus exercet. Raro quisquam non aliquam partem corporis imbecillam habet.—
> *Celsus*, Lib. I., Cap. iii.

The general problem of the degree of concomitance between physique and psychological and temperamental characteristics has claimed the attention and interest of the medical profession since the days of Hippocrates. The purpose of classifying patients within constitutional groups is extremely valuable, if on the basis of empirically verifiable evidence, the diagnostician can make a valid and reliable judgment about a person's probable disposition toward and resistance against mental and physical disease. Whether we have reached this stage in the progress of clinical knowledge is still open to question.

An examination of the following systematic classifications of bodily types which physicians, psychologists, biologists, psychiatrists and anthropometrists have claimed to exist and recognize shows that there is essentially a proportional relationship between different contrasted bodily segments. Particulary does this apply to the bodily cavities and the development of the limbs.

Hence, one can detect among the descriptive terms classified in Column 1 of Table 1 a certain consistency of relationship between *the bodily cavities and the extremities, the former narrow,* and the latter somewhat lengthened. Similarly, the terms in Column 2 refer to a description of the proportions between relatively large bodily cavities and shortened extremities. In the third column the terms refer *generally* to a relatively balanced symmetrical relationship between the development of limb length and the bodily cavities. In the last column are grouped the terms used in type classifications where cerebral functions have been sufficiently marked to justify the naming of a particular type.[1]

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[1] Throughout our subsequent discussion we will speak of "type" in the sense that Kretschmer understands it, viz, a characterization of those individuals constituting a group in which a certain emphatic consistency of

TABLE 1

Classification of Constitutional Types

	1	2	3	4
Hippocrates (460-ca. 400)	Habitus phthisicus long - thin	*Habitus apoplecticus* *Short - thick*	—	—
De Haller (1750)	—	—	Athletic	—
Halle (1797)	Thoracic	Abdominal	Muscular	"type nerveux et cephalique"
Cabanis (1802)	—	—	Muscular	"type nerveux"
F. T. de Troisvèvre (1821)	Thoracic	*Abdominal*	—	"type cranien"
Rostan (*1828*)	Respiratory	Digestive	Muscular	Cerebral
Walker (1852)	—	Nutritive beauty (Venus)	Locomotive beauty (Diana)	Mental beauty (Minerva)
Carus (1853)	Asthenic	Phlegmatic (Plethoric venous)	Athletic	Cerebral
Di Giovanni (1877)	Phthisic *First combination*	Third Combination	Plethoric Second Combination	—
Beneke (1878)	*Hypoplastic*	Hyperplastic	*Normal*	—
Manouvrier (1902)	Macroskeletal	Brachyskeletal	Mesoskeletal	—
Stratz (*1904*)	Melandodermic (Racial)	Xantodermic (Racial)	Leucodermic (Racial)	—
Virenius (1904)	Epithelial	—	—	—
Sigaud (1908)	*Respiratory*	*Digestive*	Muscular	—
Bean (1912)	Hyper-onto-morph (Hyper-phylo-morph)	Hypo-onto-morph (Hypo-phylo-morph)	Meso-onto-morph (Meso-phylo-morph)	—
Bryant (1915)	Carnivorous	—	Herbivorous	—
Mills (1917)	Asthenic	*Hypersthenic*	*Sthenic*	—
Brugsch (*1918*)	*Narrow* chested	Wide chested	Normal chested	—
Viola (1919)	Microsplanchnic	Macrosplanchnic Megalosplanchnic	Normosplanchnic	—
Davenport (1923)	Slender biotype	Fleshy	Medium	—
Stockard (1923)	Linear	Lateral	—	—
Aschner (1924)	*Slender*	Broad	Normal	—
Bauer (1924)	Asthenic habitus	*Hypersthenic habitus*	—	—
Bounak (1924)	Stenoplastic	*Euryplastic*	—	—
Draper (1925)	Gastric ulcer	Gall bladder	—	—
Kretschmer (1925)	Leptosome (Asthenic)	Pyknic	Athletic	—
MacAuliffe (1925)	*Flat*	Round	—	—
Weidenreich (1926)	Leptosome	Eurysome	—	—
Huter (1928)	Empfindungstypus	Ernährungstypus	Kraftstypus	—

Some of these classifications have been related by their authors, either explicitly or implicitly, to certain characteristic dispositional classifications. In referring to a somewhat similar summary of constitutional concepts, Wertheimer and Hesketh (74) state that

> . . . it may appear inappropriate, or even unjust, to chart side by side, the classical traditional types of Hippocrates, the romantic-symbolic system of Carus, the esthetic mythological analogies of the English anthropologist Walker, the dogmatic pathological "combinations" of de Giovanni, and the clinical anthropometric findings of Manouvrier, Viola, Brugsch and Davenport, the brilliant intuitive divisions of Sigaud and his pupils which have been put to clinical use by Julius Bauer, the pathological-anatomical observations of Rokitanski, Beneke and Kundrat, the anatomical types of Mills and Stockard, and the careful clinical descriptions of the psychiatrist Kretschmer.

At the same time it is this very diversity of approach with the similarity of described patterns which makes such a classification all the more instructive. It might appear that we have advanced very little in this matter of constitutional classifications beyond verifying the intuitions of the ancients and adding synonymous terms in support of the Hippocratic division of humoral types. However, we have gained considerably in our knowledge of the interrelations of the nosological entities and of their interdependence with somatic pattern. It is not surprising that within recent years we find a greater variety of constitutional groupings; as our knowledge of the functions of the activity of the autonomic nervous system and of the glands of internal secretion has advanced, we should be in a position to understand better newly discovered correlations between morphology and characteristics of personality and temperament. Further delimitation of types would be a natural sequence.

In certain cases it is possible to trace the evolution of some of

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physical or psychical qualities renders those belonging to that group qualitatively distinct from people belonging to other groups. The type-name is merely a shorthand description of a reduction of diverse phenomena possessing some common denominator. This approach is considerably different from that of Sigaud which Kretschmer (38) criticizes and from the interpretative analytical approach of Dessoir (10) (11) with his tripartite teleological classification of mankind into "Seinsmenschen," "Leistungsmenschen," and "Lebensmenschen." The multiplicity of type conceptions is indicated in Allport and Vernon (1), Klüver (32) (13), and Kahn (29).

these classifications. For instance, a special anthropometric technique was devised for clinical purposes in 1654 by Johannis Sigismundi Elsholzius who anticipated by some 200 years the work of Achille di Giovanni, founder of the modern anthropometric school of whom the outstanding advocates have subsequently been Viola and Nicola Pende. The type-classifications of Sigaud, MacAuliffe and others of the French school can be traced to the investigations of F. Thomas de Troisvèvre who published the results of his observations in 1821. Moreover, the essential ideas underlying the classifications of Bean (3) and Bryant (6) and the observations of Mills (48) can be found in the work of Spigelius who in 1612 described a ratio between intestinal and body length. In 1765 de Haen became interested in the possibility of a relationship between disease and variations in the positions of the internal organs, while Treves (69), in 1886, in the course of a series of lectures on the intestinal canal and peritoneum in mamalia, classified types of intestines according to whether they belonged to carnivores or herbivores. This means of classification was formulated on the basis of the results of a systematic examination of the abdominal viscera of approximately 200 species of animals. It is clear that the number of *attempts to classify bodily types has rapidly increased within recent* years.

The general study of constitutional build or "habitus"—a term in good standing in constitutional medicine—has been approached from different points of view. Kretschmer (35) gives a clue as to how these methods of diagnosing bodily-types and personality-types may be classified. They may be regarded as falling within the following groups:

1. The clinical diagnosis of psychoses, e.g. schizophrenia and manic depressive psychosis.
2. The diagnosis of bodily types by means of constitutional indices (*Somametric* diagnosis).
3. The diagnosis of bodily types by means of clinical observation (*Somascopic* diagnosis).
4. The diagnosis of bodily types on the basis of a combination of observational techniques and metric measurements (*Scopometric* diagnosis).[2]

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[2] Suggested by author.

5. The diagnosis of personality types by means of "autodiagnosis," where the subject answers questions presented either during an interview or when answers are expected in response to a paper and pencil test.

6. The diagnosis of personality types by means of the observation of behavior.

7. The diagnosis of personality types by means of a combination of the two preceding methods.

Kretschmer's own classification of pyknics, athletics and leptosomes or asthenics with the diatheses of manic-depression and schizophrenia corresponding to the first and last named groups is itself a typology that has stimulated much research in the field of abnormal psychology. According to Kretschmer it is quite possible to classify normal personalities into two groups of cyclothymes and schizothymes corresponding in a general way to the pyknic-asthenic bifurcation.

Before considering this typology further it is important to have a clear understanding of what is meant by "constitution" in this essay. It is an ambiguous term. It may be defined as the total somatic pattern characteristic of an individual and which is a resultant of the interaction of both genotypic and paratypic factors. Those factors more decidedly genotypic, are relatively fixed in character and form at the time of the fertilization of the egg-cell; those more decidedly paratypic are changing every moment of our lives and thus on the whole are more amenable to environmental conditioning than the genotypical group. Expressed another way, the genotypical contributions to individual development may be regarded as one's inherited "*Anlage.*" Without necessarily committing ourselves at present concerning the reliability of correlation between physiognomic appearance and psychic factors, we wish to indicate that the term "constitutional build" or its synonym "constitutional habitus" refers to the visible somatic structure.

Until empirical checks on Kretschmer's work were made, the strictly experimental method had been little applied to the problem of determining what were the psychological equivalents of various body types. It is true that our information had been the fruits of analytic insight, but only on the descriptive level. Thus a new phase in what can be termed "experimental clinical diagnosis" was at hand. It is impossible to cite anything but the smallest fraction of the vast amount of work that has been done in this direction,[3] but an attempt has been made to select representative samples of research to indicate the present trend of thought and experimentation.

The work of van der Horst (71) has indicated an emphasis in the direction of investigating the differences in the sensori-motor and perceptual reactions of subjects classified according to Kretschmer's constitutional schema. Munz (50) and Enke (13) used the Rorschach test and found that the leptosomes gave studied "kinesthetic answers," replying in a less emotional and more sophisticated way then did the pyknics. The former were inclined to see the representations as wholes while to the pyknics the figures were more prominent in detail. The subjectivity of the responses was in favor of the schizothymes. Scholl (62) tachistoscopically exposed colored figures to see whether color or form was more diagnostic of one group of people than of another. Those classified as cyclothymes were more sensitive to color while the schizothymes relied more on form as the basis for their judgments. Kibler (30) and Enke (13) verified these conclusions. Enke (14) has also contributed data concerning differences in the affectivity of the three constitutional types revealed in the psycho-galvanic reflex experiment. Pfahler (59) believed that differences in perseverative ability sufficiently differentiated the personality groups of schizothymes and cyclothymes, the former being strong and the latter weak perseverators. This investigator considered that these differential reactions could be discovered among children as young as ten or eleven.

Russian studies seem to have stressed differential psychomotor responses and physiological functions when subjects were classified according to the Kretschmerian typology. Whatever may be the limitations of the experimental methods[4] of these workers it appears that the leptosomes are more perseverative, stereotyped, abstract, analytic, intensive, suppressed and subjective in their feelings, while the pyknics are objective, changeable and emotionally naive.[5] Surveys by Wertham (73) and Enke (15) (16) indicate those investigations involving thorough studies of perception span, reaction times, abstraction, "Spaltungsfähigkeit" or "cleavage capacity," sensitivity to color and form, word associations, affectivity tested by means of the psychogalvanic reflex, tapping rate, handwriting and intelligence. Particularly representative of this type of approach are the results recorded by Enke (16). For instance, compared with pyknics, leptosomes showed more "cleavage capacity," were more perseverative, systematized better, and were more theoretical and abstract in their thinking. Age differences were inconsequential so far as the results were concerned.

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[3] Jelliffe (28) notes that in 1922, one writer had collected 3,000 titles in the literature of the field of constitutional medicine. Since 1917, Julius Bauer and his co-workers have been annotating all the bibliographical references in medical science on this topic and within the period of three years—1928, 1929 and 1930—alone, 3,000 separate studies are listed.

[4] Kretschmer (38) points out that the difficulties attendant upon experimenting with personality or clinical types are common to all forms of statistical and experimental work. Where the data are collected in the study of "naturwissenschaftlichen Problems" variables are difficult to identify, vary and control.

Kretschmer and Enke (39) have investigated the psycho-motor and affective characteristics of athletics whose ages ranged from 16 to 65. Persons of this physique appear to be quiet, slow and reflective. They are staid in their method of expression, gestures and gait. Their handwriting indicates an absence of complete motor relaxation. They are not noticeably creative or imaginative. Temperamentally they are stable and stolid with a minimal sensitivity to stimuli: they lack adaptability, show great persistence, are limited mentally and socially and in all experimental situations reveal the basic trait of "viscosity" or general sluggishness. On the basis of this and previous researches the authors summarize as in Table Ib the characteristic temperamental and disease entities of the three constitutional groups, pyknics, athletics and leptosomes.

In America several investigations have been made where groups of subjects were classified constitutionally according to Kretschmer's typology.[6] These inquiries may be conveniently divided into three groups: the first includes various attempts to verify some of Kretschmer's claims by determining the degree of correlation between physique and psychosis. Of these the researches of Wertheimer and Hesketh (74), Farr (17), Shaw (63), Garvey (20), Camp

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[5] A thorough survey of the experimental results obtained by German investigators appears in a series of papers edited by Kroh (40). Pfahler (59) contributes a lengthy presentation and critique of current type theories.

[6] We are not here concerned with the many researches dealing with the wider problem of the relationship between physique in general and characteristics of personality; representative of this approach are the investigations of Paterson (58), Sheldon (64), Heidbreder (26), Naccarati & Garrett (53), Garrett & Kellogg (19).

TABLE 1b

SURVEY OF THE FORMS OF TEMPERAMENT

Constitutional Type	Affinity to temperament		Affinity to disease	
Pyknic	Cyclothymic Temperaments	hypomanic syntonic. heavy blooded.	Alternating psychoses	
Leptosome	Schizothymic Temperaments	hyperaesthetic middle positions. anaesthetic.	Schizocaric nuclear-groups of schizophrenia	
Athletic	Viscous Temperaments	phlegmatic. explosive.	Groups of katatonic dissolution in narrowly defined dementia praecox	Schizophrenia
			Epilepsy	

bell (8) and Burchard (7) are the most prominent. The second group includes studies which examine the differential responses of pyknics, athletics, and asthenics tested in respect of such mental and psychomotor functions as digit memory span, general information, withdrawal attitude, *"Spaltungsfähigkeit,"* cancellation of letters and numbers, rate of tapping, speed of writing, color fusion and reaction times. The work of Mohr and Gundlach (49) and of Klineberg, Asch and Block (31) typifies this approach. Since the last named were careful to observe certain statistical criteria and used as subjects those who were homogeneous in respect of age, socio-economic status, intelligence and educational background, it is necessary to consider their work further. A group of 153 male college students and another of 175 female college students were divided into pyknic and leptosomic categories. The subjects belonging to each of these two classifications were tested in such functions as cancellation of numbers, incidental memory, *"Spaltungsfähigkeit,"* digit memory span, mental ability, scholastic aptitude and withdrawal attitude. Concerning the results of the performances of the male group it was found that all the correlations between the mental tests were too low to be considered significant, with no evidence of a central factor of general ability running through them. Using three different methods of classifying their subjects into the pyknic and leptosome groups, the investigators found no reliable differences between these groups on any one mental test. Concerning the female group of subjects, Klineberg, Asch and Block found that

> The correlations of the test results and four physical indices were low, for the most part unreliable, and often contrary in trend to what might be expected from the Kretschmerian schema. An intelligence test administered along with this battery also showed negligible relationship to physical criteria.[7]

It was concluded that on the whole the results negated the Kretschmer theory. The following statement by the authors implies a recognition of the shortcomings of the choice of functions investigated:

> The present study furnishes negative evidence concerning the presence of two psychological types in the normal population. This conclusion must, of course, be interpreted while keeping in mind the limitations of this attempt, particularly with

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[7] *Op. cit.*, p. 209.

> reference to the number of subjects and *the range of mental* functions. It is possible that the proposed types differ in their *reactions to situations with which we did not deal*.[8]

The authors point out the differences in the experimental approach and treatment of the results by German and American investigators, at the same time they summarize some of the outstanding factors which in their opinion obscure the conclusions of the Germans. These are:

(*a*). Heterogeneity of age, intelligence, social economic and educational backgrounds, and sex.

(*b*). Unknown test reliabilites.

(*c*). Absence of measures of dispersion and of the significance of differences between measures.

The criticisms are pertinent and valid. In concluding their interpretations, Klineberg, Asch and Block state that

> While it would be premature, at present, to regard Kretschmer's types as another ballet of ghostly categories, the results of the present investigations, with the use of methods more careful than those of Kretschmer's group, have consistently failed to provide evidence for the presence of types *which they claim to have found. The typology may still be* important in cases of marked maladjustment, but we have not been able to find in it any psychological significance in the case of the normal biotypes.[9]

It should be remembered however that despite their more accurate control of variables unheeded by the German workers, these three investigators have assumed that it is possible to indicate the differential responses of these constitutional and psychological types solely on the basis of performances in such tasks as perceptual recognition, memory span and general information.[10] Along with the above mentioned study much of the German work has overlooked the significance of an essentially fundamental hypothesis underlying Kretschmer's presentation of the relationship between constitutional build and qualities of temperament or personality. Whether he is concerned with psycho-pathological or the more normal psychological types, Kretschmer considers the total personality patterns and not isolated psychological traits with little relation to the integrated personality. Thus to justify or destroy the Kretschmerian classifications on the basis of evidence referring to the relatively simple tasks of perception, memory, discrimination and motor skills is to overlook the importance of such characteristics as affectivity, social leadership, extraversion and ascendance. These last named qualities are significant clues in the classification of the psychological types claimed to be associated with definite constitutional patterns. Whereas experimental psychology has supplied us with data concerning the differential responses of subjects belonging to the pyknic, leptosomic and athletic groups, we are not justified in concluding that because these results are not obtained under other conditions the Kretschmerian classification should be considered fundamentally fallacious. Certainly in all such investigations a careful analysis should be made of the kind of psychological functions to be tested and the degree with which they are related to the general patterns described by Kretschmer, the conditions under which the experimental methods are conducted, the methods of classifying the subjects into the constitutional types, the adequacy with which scientific procedures are effected, and the interpretation of the results: hence, the above quotation is at the same time a pertinent criticism of the work of others in the field, as well as one of partial self condemnation in respect of the methods and aims of a type of research which " . . . furnishes negative evidence concerning the presence of two psychological types in the normal population."[11]

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[8] *Op. cit.*, p. 133.

[9] *Op. cit.*, p. 215.

[10] The error involved may be due to the unlikely hypothesis that these functions are significantly related to more complex personality traits; or it may be largely a function of the experimental method. Concerning the latter possibility, Kretschmer (38) writes:

> "The mathematical-experimental method suffers from a much greater dearth of facts, and *from* the *purely empirical standpoint, it invariably* amounts to a clumsy abstraction which at best isolates a small number of factors from a complex of factors and treats them as *representative of an infinitely more complex object*" (pp. 177-178).

The third group of American investigators in this field have studied a miscellaneous set of problems. Dividing his subjects into pyknics, athletics, and asthenics by the application of the Pignet Index, Pillsbury (60) found "that the average grades of the pyknic students were uniformly lower than for the athletic and asthenic groups, and that more of the pyknics dropped out of college before finishing than did those of the other types." Travis, Malamud *and Thayer (68) found* that when comparisons were made with groups of normal speakers, a majority of stutterers "fell into the leptosome and leptosome-athletic groups."

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[11] Klineberg, Asch & Block. *Op. cit.*, pp. 214-215.

In Odessa, Krasusky (34) studied *100* male children whose ages ranged from eight to fifteen. In view of the implications and assumptions involved in this study, it is worthwhile to devote some attention to it. Of the total group, Krasusky was able to diagnose 29 as pyknic, 28 as asthenic and 43 belonging to a mixed group. He was able to correlate a clearly described cyclothymic temperament with the pyknic constitution and an equally clear schizothymic pattern in the case of the leptosomes. The cyclothymes showed fluctuations of joyful and depressing moods. They were subject to angry flare-ups and then sorry for what had been said and done. They were affable and altruistic, good humored, realistic and easily *excited; they had a tendency to dominate others, were very lively* in their expansive moods and showed indecision in action. The schizothymes were characterized by their lack of humor, their small circle of friends, a general *inhibition of emotional excitement*, a tendency to repress such emotions as joy and sorrow, an egoism displayed in action, a tendency towards subjectivism and phantasy and "an absence of directness of behavior and mental outlook." Probably because these children lived a good deal apart in their own world of phantasy there was a sharp contrast between the external world and their own. Krasusky thought it possible to divide the children he observed into two classes:

1. Those who were *active, energetic, and expansive, and who* strove to dominate others in work and play.
2. Those who were weak and passive and who had a marked capacity for phantasy or autism.

In the whole group the author found only six athletics. While he raised the question whether the athletic type is nothing but a *fluctuation between the asthenic and pyknic types, he himself* gave no direct answer although the affirmative implication is rather self-evident. *He* accordingly included his small group of children diagnosed as athletics in the mixed group. He found no characteristic personality or character traits among the athletics. Among the asthenics there was a greater tendency towards tuberculosis than in any other group. In order to emphasize the classification on the basis of temperament, Krasusky drew up a schedule of thirty-two trait descriptions characteristic of the cyclothymic and schizothymic types. Teachers were consulted in obtaining this information. Krasusky concluded his observations as follows:

1. Kretschmer's classification of people into physical and temperamental types has been verified among school children.[12]
2. Among girls, constitutional and temperamental types are just as evident as among boys.[13]
3. With deviations from the regular constitutional types of physique there are to be seen corresponding changes of characterological types.
4. The explication of the fundamental types of physique among school children has great significance for both teaching and medicine. As the teacher and doctor may know, the individual child can be treated according to whatever constitutional group with its characteristic traits of temperament he belongs.

Ssucharewa and Ossipowa[14] claim that children with schizothymic reactions are of an astheno-athletic build; they are musical and excel in literature. Those with cyclothymic reactions have a pykno-athletic physique; among these it is difficult to find musical or literary ability although there seems to be present a well developed sense of motor rhythm together with outstanding drawing and technical skill.

In a separate investigation, Ossipowa (55) concluded that the morphological and characterological formations begin in early childhood and that types can be recognized in both dimensions at this stage of development. The largest number of imbeciles in the group of males studied belonged to the dysplastic group. A correlative study carried out by Ssucharewa (65) with girls, ages 8-14, as subjects, showed that the pyknic type was the most universal with a like preponderance of children with cycloid characteristics.

With the work of Schlesinger, Nissen, Weidenreich, Chaillou and MacAuliffe, we are introduced to another physical type, the "eurysome," which apparently can be distinguished from the leptosomes and pyknics. Eurysomes are classified primarily on the basis of the shape of the head, the development of certain teeth and the jaw bone, the shape of the forehead and the general facial configuration estimated by means of linear facial measurements. In line with Weidenreich (72), Nissen (54) adopts the leptosome-eurysome categories and describes the leptosome face as small, oval and longish in appearance, that of the "eurysome," broad and short. With each of these apparently typical cranial and facial classifications there is an accompanying general constitutional build but always with reference to the basic features of the "Geschictshädel." In the case of the leptosome there is the long, elongated graceful body and small sloping shoulders. The eurysome has a shorter stocky body with a broad trunk and shoulders. Various attempts have been made to discover the validity of these classifications among children and adults and to estimate the degree of correspondence between these classifications with other types such as those of Sigaud and Kretschmer. Nissen considers that leptosomes can be readily recognized in childhood and that at the age of eighteen adolescents can be classified as pyknics although this type is not easily recognized until the subject has reached the age of thirty or forty; athletics, he maintains, do not appear until the end of pubescence. He holds that Sigaud's respiratory type cannot be accurately determined among boys or girls before the sixteenth or fifteenth year although the muscular type can be easily detected in fifteen year old girls and in sixteen year old boys. However, after reviewing the work of other investigators, Nissen concludes that Sigaud's classification of constitutional types cannot be accurately applied to children and is not recommended before the age of fifteen in the case of girls nor before that of sixteen when boys are considered. On the contrary he believes that the determination of leptosomes and eurysomes among children of age nine to ten years gives satisfactory results; this particular classification, he maintains, would be valid for both sexes and for all races.

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[12] Despite Krasusky's admitted inability to establish validly either the dysplastic or athletic types.

[13] Krasusky mentions that the ease with which the types can be recognized among boys and girls may be due to the absence of secondary sex characteristics.

[14] Quoted by Miller (47).

Schlesinger (61) presents a somewhat different viewpoint. He draws attention to the fact that not only is there considerable overlapping of types in early childhood and in infancy but that one type, in the course of phylogenetic development, may become an entirely different one at a later stage. He holds that the leptosome type corresponds with the cerebral type; it is most frequent among boys around the ages of 13 and 14, but it soon develops into the respiratory type. He notes that the early sexual development of *girls produces a greater degree of variability of the general constitutional pattern than it does among boys.*

If more evidence is needed to convince one of the hopelessness of arriving at any clear cut impressions concerning the classification of children into types, one must read Schlesinger further when he reports that within the first half year the pyknic type and the general eurysome picture with a broad thick-set appearance occurs just as frequently as its antithesis, the leptosome. In the third year of life the pyknics are more frequent than the so-called average type for it is the *pyknic type that gives the age of infancy its characteristic stamp.* In the second decade there is an *increase in the number of pyknics,* an increase that is much greater with girls both during and after puberty. From the foregoing, the general conclusion is reached that the pyknic type is the most prevalent among the young children. Schlesinger draws attention to the possibilities that temporal displacements in the growth of the physical pattern resulting from racial characteristics, of activity in sport causing extensions of the constitutional pattern among young people, and of pathological processes involving the growth of definite endocrine organs, are not always obviously expressed in changes of physical configuration. Weidenreich finds no practical use for the concepts of respiratory or digestive types, preferring to use the terms "leptosome" and "eurysome," although he does not mean these to be regarded as the equivalents of the discarded terms. It should be noted that his observations regarding Sigaud's classification were exclusively based on his study of adults. The investigations of Lederer, Bauer and Motschan[15] do not justify the use of Sigaud's concepts with young children as subjects. According to Chaillou and Macauliffe[16] the cerebral and muscular types begin to develop at the end of puberty: leptosomes can be distinguished from eurysomes in early childhood.

In a thorough examination of the bio-typologies of such authorities as Kretschmer, Wiersma, Berman, Pende and Jaensch, Willemse (77) used Kretschmer's typology in classifying juvenile delinquents in South Africa. The personality characteristics and delinquent acts of youths belonging to one group were characteristically different from those of lads belonging to another group. For example, because of their egocentricity, fearlessness, and lack of social scruples, athletics have a poor social prognosis. The leptosome carefully and systematically plans his delinquent acts which he usually commits alone, while the delinquencies of the pyknic generally take the form of sexual excesses, alcoholic intemperance, and leadership of criminal gangs.

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[15] Quoted by Weidenreich, *Op. cit.*

[16] Quoted by Nissen, *Op. cit.*

SUMMARY

1. A survey of the historical development of the classifications of bodily types reveals a certain consistency of interpretation of a proportional relationship between contrasted bodily segments. It is thus possible to trace the evolution of some of these classifications.

2. The diagnosis of bodily types can be made by means of measurements and their combination (*Somametric* diagnosis), by clinical observations (*Somascopic* diagnosis), and by a combination of observational techniques and metric measurements (*Scopometric diagnosis*). Each of these methods has been applied in the differentiation of pyknics, athletics, and leptosomes.

3. Personality types can be differentiated on the basis of data supplied by an individual's self-diagnosis (autodiagnosis), by observations on his behavior by others, or by a combination of both these methods.

4. The advent of Kretschmer's conclusions concerning the physical and personality classification of patients has stimulated many extensive experimental investigations to prove or disprove the validity of correlations between constitutional and temperamental characteristics.

5. Empirical attempts to discover differential responses on the part of Kretschmer's constitutional groups have been confined to certain mental and sensori-motor functions such as word associations, memory span, "cleavage capacity," tapping rate, color fusion, perception span, reaction times, "perseveration," cancellation of numbers, and performances on standardised mental tests. While the conclusions formulated from these results aid us in obtaining a clearer conception of the psycho-motor responses of the subjects belonging to each constitutional type, the data supplied are inadequate and

irrelevant as criteria for an added understanding of personality with its "complex, well-structured systems of attitudes and traits."

6. European investigators have found that pyknics are more susceptible to color than either leptosomes or athletics; their associations are more colored by feeling than are those of subjects belonging to either of the other two groups; they excel in the description of details. Compared with leptosomes, pyknics are more synthetic, objective and adaptable in their mental disposition while their motor coordination is also superior. In handwriting, pyknics are freer, more labile and expansive than leptosomes Compared with pyknics, leptosomes are more sensitive to form; their ability to dissociate is more marked and they are more "perseverative" in their associations; their descriptions are subjectively determined; they are emotionally restricted, analytical, abstract, inelastic, and they find it difficult to relax.

7. American investigators have failed to reach such convincing conclusions. Klineberg, Asch and Block found no significant relationships between physique as determined by Kretschmer's three constitutional groups and many of the mental and sensori-motor performances reported in the European studies. Mohr and Gundlach found only slight differences between the performances of three constitutional groups, and suggest that asthenics and athletics should not be grouped together within a single category.

Kretschmer and Enke have revealed the psycho-motor and affective characteristics of athletics contrasted with those of pyknics and leptosomes.

8. Generally, American researches have observed the necessity for controlling variables and have presented their data in a more adequate statistical manner than European clinicians have done.

9. German investigations have failed to recognize the necessity for controlling such variables as homogeneity of race, age, intelligence, sex, and socio-economic status. Moreover, the ambiguous criteria for recognising the constitutional types, together with the subjectivity of judgments, have made it very difficult to duplicate situations to test the validity of Kretschmer's classification.

10. Where subjects have been psychotic patients it has been shown that in general there is a positive correlation between types of physical habitus and the schizophrenic and manic-depressive syndromes.

11. Attempts have been made to correlate Kretschmer's types with other physical types such as those of Sigaud. Opinions conflict concerning the degree of correspondence.

12. There is a discouraging confusion of thought concerning the age when Kretschmer's constitutional types can be recognized.

13. Despite many attempts to divide subjects into pyknics, leptosomes, and athletics on the basis of either scopometric or somatometric observations, the degree of overlapping between groups makes it practically impossible to agree upon the validity of any one constitutional index to separate these types. This may be due either to the inadequacy of the indices or to the presence of heterogeneous variables that cannot be conveniently controlled.

14. In the majority of the investigations surveyed, the subjects concerned were inmates of institutions or patients attending psychiatric clinics. Psychological and physical data have been rarely obtained from individuals living relatively normal lives.

15. Including those who have been interested in dealing with typologies other than Kretschmer's, the following is a tentative classification of groups of investigators:

(*a*). The Russian school centering around the work of the Psychoneurological Clinic for Children at Moscow under the direction of Gurewitsch (24). Extensive work has been carried out by Ossipowa, Ssucharewa, Oseretsky, Lederer, Motschan, Coerper, Nikolajew and Jislin.[17]

(*b*). A German group of whom Enke is representative working at the Marburg Nerve Clinic under the direction of Kretschmer.

(*c*). A Dutch group of investigators under the leadership of Wiersma and van der Horst.

(*d*). Various American investigators such as Klineberg, Asch and Block, Wertheimer and Hesketh, Mohr and Gundlach, Pillsbury and Burchard.

(*e*). The researches of Willemse in South Africa, whose subjects were delinquents and criminals.

16. In those investigations where there has been an inadequate recognition of the necessity for controlling such variables as sex, age, intelligence, etc., there has been a marked relationship between

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[17] Adequate summaries of the investigations of this group of workers together with appropriate bibliographical references are to be found in Ossipowa (55) and Gurewitsch (24).

physique represented by Kretschmer's types and personality characteristics or performance in certain tests; where there has been provision for a necessary control of these variables very little relationship has existed between the constitutional groups and the personality functions tested.

17. The limitations of the majority of the researches reported on the preceding pages relate to:

(*a*). The nature and selection of the subjects.

(*b*). The use of tests insufficiently standardized.

(*c*). The reliance upon one methodological approach in obtaining data relating to personality.

(*d*). The testing of functions not necessarily indicative of the presence of schizothymic or cyclothymic personality patterns.

(*e*). The inadequacies of the experimental situation.

(*f*). The statistical treatment of the data.

(*g*). The lack of appropriate motivation on the part of the subjects.

The following questions unanswered by the previous investigators still offer a challenge:

1. Among normal adolescents can we associate with the pyknic, leptosome, and athletic types of constitutional build those qualities and patterns of personality which Kretschmer's claims would lead us to expect?

2. If Kretschmer's claims are not verified can we discover any relationship between any of the three constitutional types and any aspects of personality not provided for or implied by Kretschmer's theory?

3. Further, whether the answers to the foregoing are either affirmative or negative can we detect any relationship of any sort between qualities of personality and other types of physique?

We propose to select our constitutional types as carefully as possible from a fairly homogeneous age group with normal adolescents as subjects. By various methodological approaches we will then collect information concerning the personality patterns of the subjects within each constitutional classification, and investigate the degree of relationship between the two sets of data. In the diagnosis of qualities of personality we will not investigate the sensori-motor or perceptual functions of the subjects, but will consider the more complex systems of personality traits.

II. STATEMENT OF THE PROBLEM: METHODS OF COLLECTING AND RECORDING DATA

This investigation is divided into two sections with related but not identical aims:

1. An estimation of the kind and degree of concomitance between the physique represented by pyknosomes, leptosomes, and athletosomes[18] and certain personality patterns characteristic of those subjects classified within each of these three constitutional groups. We propose to put to the test the Kretschmerian hypothesis that with pyknosomic build there is associated a cyclothymic type of temperament and with the leptosomic and athletosomic bodily build there is associated a schizothymic type of temperament. As already stated, the investigation will be confined to the adolescent stage of development.

2. An estimation of the kind and degree of relationship between other types of physique indicated by certain extremes of bodily build and many of the same personality patterns discovered in connection with the above section. In this section the Kretschmerian typology will be disregarded. In both investigations the population from which the types were selected was identical. Two hundred and twelve boys mostly in graduating classes of three public high schools, hereafter referred to as Schools *A*, *B*, and *C*, constituted the general population from which our comparative groups were drawn. Girls were not considered as subjects in the investigation for the following reasons:

(*a*). The difficulty of obtaining clearly marked physical types.

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[18] In this report the usual terms "pyknic," "leptosome," and "athletic" are replaced by the corresponding terms "pyknosome," leptosome," and "athletosome." The translator of Kretschmer's ***Textbook of Medical Psychology*** (36) suggests that to avoid the facetious suggestion of "pyknic" and the ambiguity of the term "athletic" there be substituted correspondingly "pyknosomatic," "leptosomatic," and "athletosomatic," and that these terms be used both as nouns and adjectives. While we agree generally with these observations we also consider that usage should be both consistent and as brief as possible. Hence we have adopted a shorter form of the revised terminology and have distinguished between the use of substantive and *adjectival* functions of the original terms. Corresponding nouns therefore become "pyknosome," "leptosome," and "athletosome," and the adjectives, "pyknosomic," "leptosomic," and "athletosomic."

In his own investigations Kretschmer confined his observations to male subjects.

(*b*). Administrative and practical difficulties involved in obtaining personality and physical data from a group comparable in size and equated in other directions with the above group of male subjects.

The distribution of the subjects according to school grades was as follows:

Grade	Percentage of total group
X	1.0
XI	17.4
XII	77.8
Post-Grad.	3.8

The average age of the whole group was 212 months (*PE*±6.4, Range 199-244 mos.) All the subjects had been measured by the Harvard Growth Study at different periods during the preceding twelve years according to the methods and techniques as outlined by Lincoln (43) (44) and Dearborn (9). In Schools *A* and *B* the Growth Study had officially completed its work with the exception of a certain number of students who for some reason or other had not graduated the previous year; in School *C* the Study was completing its twelfth and last year of work. In this last school therefore there were considerably more students from which we could select our groups than in either of the other schools. The total number of subjects was distributed among the three schools as follows:

School	Percentage of total group
A.	22.6
B.	19.8
C.	57.6

The Harvard Growth Study Record Cards of all boys at present in school who had been measured were examined and a tentative list prepared of the names of those boys whose records were continuously complete for the last five years. From this list a second one was prepared containing the names of only those boys who were in the tenth, eleventh, and twelfth grades, and in the post-graduate classes. This was done to keep the study confined as nearly as possible to the later stages of adolescence. While it was originally intended that if possible each constitutional group should consist of boys belonging to the same race this was later found to be impracticable. The number of students available for this particular study was decidedly limited; if racial classifications had been exacted and well defined pyknosomes, leptosomes, and athletosomes required within each of the four racial divisions to which the subjects of the Growth Study had already been assigned, a considerably larger total population would have been necessary to provide us with the required groups. The distribution of subjects according to racial grouping among the three constitutional classifications is indicated in Table 2.

TABLE 2

CONSTITUTIONAL CLASSIFICATION

	Pyknosomes	Leptosomes	Athletosomes	Totals
Racial Group				
Italian	4	3	6	13
Jewish	1	—	2	3
North European	4	25	17	46
South European	—	—	—	
Totals	9	28	25	62

METHODS OF COLLECTING DATA

1. *Personality Data*

(1). *Personal conferences.* (*a*). *Pre-interview.* Before the personal conference each boy was asked if he would be willing to coöperate by helping to obtain certain information. He was frankly told the general purposes of the investigation and that if any assistance in self-understanding could be given him towards the end of the school year, it would be gladly offered. The pre-interview served excellently as a means of gaining the confidence of the prospective interviewee. This was considered to be extremely important, particularly as each boy had undergone various forms of examination in the course of the work of the Harvard Growth Study with very little, and in the majority of cases, no knowledge or understanding of that project. There were many cases where a psychological barrier had to be removed because of this unfavorable reaction to the conduct of previous Growth Study investigations. In establishing friendly relations, the interviewers,[19] stressed the necessity of observing the confidential nature of the interview to the extent of refusing to discuss the information imparted in any one interview with any other boy or with members of the faculty of that particular school. In order to forestall possible parental objections to this investigation, it was stated that it had the approval and the coöperation of school superintendents and principals. The length of time of the pre-interview varied according to circumstances; in some cases it lasted as long as fifteen minutes. It was possible to reimburse a subject for the travelling expenses incurred by coming to and returning from an appointment and in addition, for any wages lost by reason of a conference held outside school hours. Where there appeared to be some doubt whether a subject was completely willing to attend a conference, he was asked to consider the matter further and, if necessary, to talk it over with his parents. Not one subject refused to coöperate and in every case the maximum amount of desired information was secured.

(*b*). *Personal Conference.* In Schools *A* and *B*, most of the conferences were held outside school hours although it was sometimes possible to have appointments during the school day. In the three schools, all the conferences were conducted on the school premises in rooms specially allotted for the purpose where privacy of communication was possible. Each of the two interviewers took approximately half of the total number of subjects. The interviewer gave the subject every opportunity to express himself freely. As each subject had to be approached differently, the manner and form in which each question was presented varied during the conference according to circumstances.[20] Wherever possible and when it was considered necessary by the interviewer the subject was asked to cite specific examples to support his opinions. The responses were recorded on a specially prepared Conference Schedule.[21] From an examination of the Schedule it will be seen that the responses to the questions are classified according to the traits or variables the questions purport to reveal. After each number, corresponding to the number of the question presented, there are two lines, a short and a longer one. On the shorter line the interviewer noted by means of an appropriate symbol the degree of presence or absence of the trait or pattern in question. The following scheme shows the system of scoring:

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[19] The writer and Dr. R. N. Sanford.

[20] Before the personal conferences were conducted, the interviewers met several times to agree upon standardised procedures and to arrive at a common interpretation of certain terms and phrasings as well as an understanding of particular emphases in the presentation of some of the questions.

+ + indicates the presence of the trait or pattern to a very marked degree.
+ " " " " " " " " " " marked degree.
0 " " " " " " " " with no particular significance.
— " " " " " " " " to a slight degree.
— — " " " " " " " " " " very slight degree.

It was not always possible to obtain a well defined impression concerning the presence or absence of a trait when the question was first presented to the subject; on such occasions supplementary questions were asked in order to fulfill, if possible, the purpose of the original question. The impression then obtained by the interviewer was recorded in accordance with the above scheme on the longer of the two lines to the right of the question number in the Schedule. To the right of this line the actual verbatim replies of the subject were recorded. Under *G* within each group of responses referring to any particular trait, the interviewer recorded his rating based upon a *general impression,* whether, for instance, the *S* was ascendant, schizothymic, competitive or cyclothymic. Check marks were used to indicate a classification of the *S* within the physical or constitutional groupings conveniently designated as *A*, *B*, *C* or *D*.

(2). *Tests and Other Diagnostic Devices.* The following is a complete list of the diagnostic instruments used. Those marked with an asterisk (*) were specially constructed for this investigation. Only these will be described here since the remainder are sufficiently well known.

A. Scale of Attitude toward the Church (Thurstone and Chave).
B. Scale of Attitude toward the Constitution of the United States (Rosander and Thurstone, No. 12, Form *A*).
C. Maller Character Sketches (Part II).
D. The Personality Inventory (Bernreuter).

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[21] See Appendix.

E. Score Card for Socio-Economic Status (Sims, Form *C*).
F. Allport *A-S* Reaction Study.
**G*. Rating Scale (Form *B*).
**H*. Rating Scale (Form *A*).
**I*. Classification Sheet.
**J*. Conference Questions.
**K*. Trait Study.

(*G*). *Rating Scale B used for self-ratings* (*R.S.B.*). This scale consists of a series of 34 statements.[22] The responses to these statements are self-judgments. A five point scale was adopted as a basis for recording the judgments in both *R.S.B.* and *R.S.A.* The following table indicates the names of the personality patterns and the number of items or statements diagnostic of each pattern with which *R.S.B.* is concerned:

Personality Pattern	No. of Diagnostic Items
Competitiveness	2
Mental Health	3
"A" (Emotional sensitiveness to the environment)	21
"B" (Social introversion)	21
"K" (Extraversion)	21

In the case of a normal individual the patterns or traits of introversion and extraversion are considered respectively as the psychological "counterparts" of the schizophrenic syndrome and the manic phase of manic-depression among psychopathic patients. Several tests for measuring introversion and extraversion exist,[23] most of which are based upon the descriptive material comprising Freyd's list of traits.[24] As Guilford and Braly (22) have pointed out, various investigators have emphasized different aspects of the introversion-extraversion dichotomy; some have stressed the direction of the individual's interest, others, the direction of the emotional reactions and still others, the social aspects. With a view to determining what group factors were present in introversion and extraversion as measured by existing tests, Guilford and Guilford (23) compiled a list of all the items that were considered by Jung, Freyd, Laird, Marston, Neymann and Kohlstedt, Gilliland and Morgan to be diagnostic of these two traits, and 75 items were found to be unrepeated. Guilford and Guilford selected 35 as the most representative and all of these had been mentioned by at least three of the above authors. This selected list was then given to 930 undergraduates of whom 430 were men and 500 women. Responses were indicated either as "yes" or "no." Pearson coefficients were then found and by means of the Spearmann-Dodd technique the correlation of each item with an assumed "*g*" factor found. When the weight for each corresponding item was found, the extravert items and the introvert items tended to group themselves at opposite ends of a continuum according to "a priori" conceptions. Reliability by self correlation was .81 and "the validity of the test, as denoted by the correlation of the pool of items with the '*g*' factor was .87."[25] With the application of Thurstone's method of multiple factor analysis,[26] 18 group factors were found to be present; of these, four were considered by these investigators to be the most important. One outstanding conclusion of this study was the fact that personality, as measured by the usual introversion-extraversion scales, is multidimensional and that the items used in these scales are weighted with several personality variables.

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[22] See Appendix.

[23] Questionnaires, e.g., by Heidbreder, Guilford, Laird, Marston, Gilliland and Morgan, Newman and Kohlstedt.

[24] See Freyd (18).

Two additional factor analyses of the same data made by one of the above authors showed that only two of the previously resolved four important factors were regarded as certain. These were (*a*) social introversion and (*b*) emotional sensitiveness to environment. The trait of "extraversion" was considered by Guilford to be revealed by responses in a direction opposite to that of the responses diagnostic of social introversion.[27]

With the following minor changes, the list of 35 items constituting the data for the above enquiries, was adopted as the most convenient and adequate instrument for diagnosing the traits of introversion:

1. Item 33[28] of Guilford's list was omitted. Items 5, 6, 7, 9,

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[25] *Op. cit.*, p. 398.

[26] See Thurstone (67).

[27] *For example:* While a response of "Yes" to the question: "Are you inclined to limit your acquaintances to a select few?" would be diagnostic of *social introversion*, a "No" response would be diagnostic of *extraversion*.

[28] Do you frequently rewrite social letters before mailing them?

11 of the original scale were also omitted because Guilford concluded that these statements with weights of zero apparently contributed nothing towards a diagnosis of introversion-extraversion.

2. The statements diagnostic of all the patterns concerned were arranged in haphazard fashion to guard against the possibility of stereotyped responses.

3. Opportunity was provided to record one's responses on a five point scale; this provision for grading one's analytic self-judgment should tend to remove any psychological objection or inability to categorically classify one's self as either "Yes" or "No." Apropos this issue, Guilford and Braly say that:

> It is assumed in this study that with few possible exceptions the questions are not completely disjunctive; that probably a large group of individuals would distribute normally over the entire Yes-No range for any one question.[29]

Since our purpose is to deal only with those cases showing extremes of any particular trait, average ratings are automatically disregarded in the final assessment of all judgments concerning that particular trait or pattern.

4. Since the form *R.S.B.* is essentially a device aiding autodiagnosis, the nominative form of the first personal pronoun was used in each statement.

5. Minor changes in the method of expression were made to conform to the demands of school situations; for example, in Item 21 in Guilford's list, . . . "in public" . . . becomes ". . . . . before a large group."

(*II*). *Rating Scale A used by teachers* (*R.S.A.*). This consists of a series of 52 statements.[30] The following table lists the various personality patterns diagnosed by means of this instrument together with the number of statements or items concerned with each pattern:[31]

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[29] *Op. cit.*, p. 381.

[30] See Appendix.

[31] It is recognized that there may be considerable overlap of the selected variables, but

(*a*). Apart from their intrinsic importance as being possibly related to physique, they are significant leads to the diagnosis of more complex personality patterns.

(*b*). They are relatively easy to diagnose from the observation of actual behavioral situations.

Personality Pattern	No. of Diagnostic Items
"A" (Emotional sensitiveness to the environment)	21
"B" Social introversion)	21
"K" (Extraversion)	21
Cyclothymic trends	6
Schizothymic trends	6
Competitiveness	2
Talkativeness	2
Intellectual leadership	3
Social leadership	3

One hundred and thirty teachers coöperated in judging the subjects. Each teacher received a satisfactory remuneration for every subject rated; this incentive encouraged one in the belief that faculty members already carrying a heavy teaching load would be more careful in this work than could be expected if it were considered as a part of regular school routine.

The following points were considered before the teachers were approached:

1. The student's program card was consulted from the school files to obtain the names of his teachers. If a teacher taught a student for only one or two hours a week, he was "prima facie" not considered as reliable a rater as one who taught the student for more weekly school periods.

2. It was intended that at least *four* teachers should rate a student; in some cases this was impossible because students taking special courses labelled as "Trade" and "Commercial" often had only two or three instructors. This was particularly noticeable in Grades 10 and 11.

3. Wherever possible more experienced teachers were chosen as raters or judges.

4. It was considered inadvisable to give any one teacher too many students to rate.

Besides *R.S.A.* the teachers who participated were given the Classification Sheet several weeks ahead of the time they were expected to return it. Apart from the obvious reason to lighten the teacher's work as much as possible, this procedure enabled the teacher to examine the documents and to whet his observational powers.

(*I*). *Classification Sheet.*[32] In its original form this classification consisted of a recital of most of the primary and secondary characteristics claimed by Kretschmer to be typical of pyknosomic, leptosomic and athletosomic build. This original list was afterwards considerably modified and the differential criteria more systematically arranged. This was done to facilitate the teacher's task of classifying the subjects. The final form of the sheet was adopted after a trial list of differential characteristics had been submitted to a group of judges who were asked to classify identical subjects. A satisfactory degree of inter-agreement among the classifications and of agreement with our own clinical observations of the physique of the same subjects made feasible and practicable a simplified scheme of classification for the teachers. The following are the clinical descriptions of the three groups:

Clinical description	Letter groups
Pyknosome	*A*
Leptosome	*B*
Athletosome	*C*
Doubtful	*D*

(*J*). *Conference Questions.*[33] This list comprised 39 questions constructed from an analysis of the most likely situations in which an adolescent boy would be expected to reveal the personality patterns about which information was sought.

(*K*). *Trait Study.* This is a modification of a scale designed by a special committee of the Progressive Education Association to measure the following traits: (*a*) creativeness and imagination, (*b*) influence, (*c*) responsibility. The schedule provides for a classification of a subject within one of five divisions corresponding to the presence of various degrees of the trait in question ranging from almost complete absence to unmistakably marked presence. This scheme conformed well to one where other patterns or traits were measured on a five point scale.

2. *Physical Data and Intelligence Quotients.*

All the physical data were obtained from the records of the

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[32] See Appendix.
[33] See Appendix.

Harvard Growth Study. Only those measurements considered pertinent for the compilation of certain constitutional indices were transferred from the Growth Study records. These measurements were as follows: (*a*) standing height, (*b*) sternal height, (*c*) sitting height, (*d*) weight, (*e*) leg length, (*f*) trunk length, (*g*) chest depth, (*h*) chest width.

The intelligence quotients for each subject were derived from both individual and group tests as reported by Dearborn (9). Before the nature and the number of the tests as well as the procedures in obtaining the personality data were finally decided, an experimental group of 15 boys was used for try-out purposes. On the basis of this experience several revisions and modifications of the original plans were made before the investigation finally began with the tests and procedures outlined in the preceding pages.

RECORDING AND QUANTIFICATION OF DATA

The data derived from the physical examinations, the intelligence tests, the personal conference and the personality tests were recorded on three Personality Code Cards[34] designated as P. C. C. 1, P. C. C. 2, P. C. C. 3. Each Code Card was devised for cabinet filing purposes and printed in a distinctive color. As much as possible, all data similar in nature were assembled on one P. C. C. For example, all the physical measurements and the derived indices as well as the intelligence test scores were recorded on P. C. C. 2, while the scores on the various personality tests were summarized on P. C. C. 3. The scoring keys for *R.S.A.* and *R.S.B.* were so constructed that it was possible to record the teachers' judgments and the subject's self-judgment in regard to the same diagnostic statement in the rating scales. These numerical ratings based on a 1-5 point scale were then transferred to the appropriate Code Card and the different sets of ratings pooled to form a composite judgment.[35] During the personal conference the interviewer considered all the verbal responses of the subject and rated them on a similar 1-5 point scale. In addition, the interviewer's general impression concerning each trait or personality pattern was noted and likewise quantified on the same scale. A final rating was then computed to which the interviewer's subjective estimate and the subject's responses to specific questions contributed their share.

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[34] See Appendix.

[35] See Appendix.

Before the statistical and interpretative treatment of the data began, all figures were transferred and recorded in 85 columns on each of five work sheets; this procedure considerably facilitated comparisons between individuals in relation to their scores in any one of the 85 columns. Generally, the arrangement of the data on the three Code Cards and the initial presentation of the results on the work sheets were determined rather by convenience and expediency than by theoretical significance.

SUMMARY

1. The general purpose of the present study is to investigate empirically the degree of relationship between physique and certain qualities of personality.

2. The study is divided into two sections:

(*a*). An investigation of the validity of Kretschmer's typology.

(*b*). An investigation of the possible relationship between certain extremes of physical build and qualities of personality.

3. Data were collected concerning 212 boys in three public high schools, each in a different city. Most of these boys were members of the 1934-1935 graduating classes. The average age of the whole group was 17 years and 8 months.

4. Personality data were collected by a special personal conference technique, from certain personality tests, and from rating scales. The subject himself as well as several of his teachers contributed data by means of rating scales filled out by the subjects, and from information supplied by teachers.

5. The following table indicates the number and nature of the personality variables considered in this study, as well as the methods by which the data were obtained:[86]

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[86] The abbreviations have the following meaning:

T.—Standardized Tests.

R.S.A.—Rating Scale used by teachers.

R.S.B.—Rating Scale used by subjects.

C.—Personal conference.

Personality data	Methods of obtaining data
Social attitudes	*T.*
Social adjustment	*T.*
Personal adjustment	*T.*
Self control	*T.*
Introversion	*T.*
Social and economic status	*T.*
Ascendance	*T.*, *C.*
Creativeness and imagination	*T.*
Influence	*T.*
Responsibility	*T.*
Competitiveness	*R.S.A.*, *R.S.B.*, *C.*
Emotional sensitiveness to the environment	*R.S.A.*, *R.S.B.*
Social introversion	*R.S.A.*, *R.S.B.*
Extraversion	*R.S.A.*, *R.S.B.*
Cyclothymic patterns	*R.S.A.*, *C.*
Schizothymic patterns	*R.S.A.*, *C.*
Talkativeness	*R.S.A.*, *C.*
Intellectual leadership	*R.S.A.*, *C.*
Social leadership	*R.S.A.*, *C.*

6. Physical data and intelligence quotients were obtained from the records of the Harvard Growth Study.

7. The recording and quantification of data was carried out so as to combine judgments received from different sources and to facilitate the comparison of the data as conveniently as possible.

8. The final selection of the tests and the adoption of the procedures in obtaining the personality data were made on the basis of results obtained from a try-out experimental group of 15 subjects.

III. KRETSCHMER'S CONSTITUTIONAL TYPES

The selection of constitutional types raises the issues between the relative merits of diagnosis on the basis of clinical subjective estimate (*somascopic* diagnosis) and diagnosis on the basis of more precise methods of measurement (*somametric* diagnosis).[37] Among German and Russian investigators in this field the observation of constitutional types in the first instance has been generally confined to the clinical observational method. Where measurements have been used, the resultant comparisons were still made on the basis of the differentiation of types subjectively determined. The vast amount of work reported in the literature of other countries which is concerned with the construction and use of constitutional indices or measurements for diagnostic purposes shall be considered as falling within two groups. In one, the aim is to separate people into type classifications primarily on the constitutional level without uniformly explicit references to the Kretschmerian typology as regards habitus and personality patterns. Such classifications have been usually made to consider the anthropological or physiological characteristics of the subjects. Within such a group fall the researches of Gesselvič (21), Benedetti (5), Bach (2), Nissen (54), Tschernorutzky and Kogan, Belowa, Koltowskaja and Pliner.[38]

In the other group it has been the intention of the investigators to use the constitutional indices explicitly separating clinical data in accordance with the Kretschmerian classification of constitutional and psychological qualities. Included in this group are the investigations of Wertheimer and Hesketh (74), Klineberg, Asch and Block (31), Wigert (76), Lederer (42), Kühnel (41), Westphal (75), Schlesinger (61), Burchard (7).

So far as the Kretschmerian schema is concerned, the present study cannot satisfactorily use constitutional indices for the separation of the particular types. Adequate norms do not exist where normal adolescent subjects are considered. If our subjects had been adults, it would have been possible, although not entirely satisfactory, to use as a basis of classification, tentative norms established by other workers. However, even here the results and methods of these investigators could not be regarded as completely valid and comparable.

For our first study of subjectively determined types, and following as closely as possible Kretschmer's criteria. We have combined the classifications made by both the interviewer and the several teachers concerning each category. A classification of judgments regarding the three types pyknosomic, leptosomic and athletosomic, was made according to whether there was 100, 80, 75, 66⅔, and 60 per cent agreement among the judges.

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[37] See IV.

[38] Reported in Tschernorutzky (70).

TABLE 3
CLASSIFICATION OF SUBJECTS ACCORDING TO PERCENTAGE AGREEMENT AMONG JUDGES

Percentage agreement	100.	80.	75.	66⅔	60	Below 60.
No. of subjects	31.	43.	12.	3	42	45

Table 4 illustrates how the subjects concerning a classification of whom there was 100 per cent agreement, were distributed according to whether five, four, three or two judges were unanimous in their judgments.

TABLE 4
CLASSIFICATION OF SUBJECTS ACCORDING TO 100 PER CENT AGREEMENT AMONG JUDGES

Maximum possible number of judges	Number of subjects
5	23
4	6
3	2
2	0

Table 5 shows the distribution of pyknosomes, leptosomes, and athletosomes according to the percentage of agreement among the judges.

TABLE 5
DISTRIBUTION OF CONSTITUTIONAL GROUPS ACCORDING TO PERCENTAGE AGREEMENT AMONG JUDGES

Percentage agreement	Number of subjects Pykonosomes	Leptosomes	Athletosomes	Total
100.	3	15	13	31
80.	6	19	18	43
75.	2	7	1	12
66⅔.	0	1	2	3
60.	11	17	14	42
Total	22	59	50	131

Table 6 shows the distribution of pyknosomes, leptosomes and

TABLE 6
DISTRIBUTION OF CONSTITUTIONAL GROUPS ACCORDING TO 100 PER CENT AGREEMENT AMONG JUDGES

Maximum no. of judges	Number of subjects			
	Pyknosomes	Leptosomes	Athletosomes	Total
5.	2	14	7	23
4.	1	0	5	6
3.	0	1	1	2
2.	0	0	0	0
Total	3	15	13	31

athletosomes among the 31 cases concerning the classification of whom there was 100 per cent agreement among the judges as indicated in Table 5.

The remaining 81 cases including "Doubtful" classifications and those who represented less than 60 per cent agreement among the judges are not included in the foregoing tables. Even all the cases in the above tables were not selected for the purposes of comparison in this study.[80] Since only subjects regarding whom there was fairly general agreement of classification were to be compared, it was considered that the limit of 80 per cent agreement, which meant that four out of five judges agreed in their estimates, should be the deciding one. Even within this limit there were further conditions governing the selection of cases. For instance, despite the fact that a subject might represent an 80 per cent agreement classification, he was not to be included in the investigation unless one of the judges was the interviewer. Because of the interviewer's greater experience and his more thorough acquaintance with the details of the physical characteristics of Kretschmer's constitutional types, his judgment was thus weighted. The number of subjects in the three constitutional groups of our experimental population is as follows:

9 Pyknosomes 28 Leptosomes 25 Athletosomes

Of our finally selected experimental group the pyknosomes constitute only 15 per cent; the leptosomes, 45 per cent, and the athletosomes, 40 per cent. The small number of pyknosomes in relation to the frequency of the existence of the other two types agrees somewhat with the findings of other investigators who support Kretschmer's view that the pyknosomes develop more markedly after the age of thirty.[40]

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[80] It is extremely important to note that only clearly defined constitutional types are considered in this investigation. Whatever the degree of relationship that exists between physique and aspects of personality, it should be most clearly evident when the subjects represent extreme cases of physical development—or most clearly marked types. Hence our justification for the elimination of many of our cases.

Discussion of Results

1. *Cyclothymic pattern (Cyclothymy)*[41]

In evaluating these results the usual $\frac{\text{diff.}}{\sigma_{\text{diff}}}$ method[42] has been used. The performance of each subjectively determined group is compared in terms of the reliability of the difference. In this particular category of personality pattern it is evident that the difference between the pyknosomes and leptosomes is considerably less than that between either the leptosomes and athletosomes or the pyknosomes and athletosomes. One would expect from a study of the correlation between pyknosomic habitus and circular disorders, and between leptosomic constitution and schizophrenic manifestations, that the difference between the two contrasted personality reactions of these constitutional groups would be relatively much more significant than in the cases of any other two contrasting combinations.

TABLE 7[43]

Personality variable	Constitutional type	N	M	σ_m	Comparison of	Diff. / σ_{diff}	Chances in 100 of a true difference greater than zero	Interpretation
Cyclothymic trends	P	9	3.2	24	P & L	.3816	64	P is higher
	A	25	2.8	.11	P & A	1.6260	94	A is higher
	L	28	1.3	.10	A & L	3.4970	100	A is higher

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[40] Pillsbury (60) found the ratio of pyknosomes to athletosomes and to asthenics 11:32:57. These figures, and others, however, are quite incomparable since the diagnostic methods in different studies have varied tremendously, while the influence of factors of age, nationality, and sex have not always been considered with heterogeneous groups of subjects.

[41] High mean scores here indicate low cyclothymic trends.

[42] By this formula the reliability of an obtained difference is expressed in terms of the chances that this difference represents a true difference greater than zero.

[43] Tables 7-28 inclusive indicate the chances in 100 of a true difference greater than zero between pyknosomes, athletosomes, and leptosomes in regard to the personality variables indicated.

Our results show that the athletosomes tend to be more cyclothymic than either the pyknosomic or athletosomic groups; concerning the leptosomes and the athletosomes, the latter are so much more cyclothymic that the difference can be regarded with certainty. However, it should be remembered here and elsewhere that we have no means of telling whether the athletosomes are but potential pyknosomes, a possibility that may be due to the age restriction of our experimental group.

2. *Schizothymic pattern (Schizothymy)*

Pyknosomes have a score indicating a more pronounced degree of schizothymy than that possessed by the athletosomes; there is no apparent difference between the contrasted groups of pyknosomes and leptosomes while the difference between the athletosomes and the leptosomes in favor of the latter, cannot be regarded as statistically significant. These results suggest the following possible sources of error:

TABLE 8

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Schizothymic trends	P	9	3.2	.17	P & L	0	50	———
	A	25	3.4	.12	P & A	.9611	83	P is higher
	L	28	3.2	.10	A & L	1.2804	89	L is higher

1. The questions may not have been sufficiently diagnostic of this particular pattern. This however is rather unlikely in view of somewhat similar results obtained in relation to social introversion and extraversion where the tests have a greater recognized validity; introversion would be expected, on the basis of clinical knowledge, to be closely associated with a schizothymic pattern of behavior.

2. So far as the responses made on R.S.B. are concerned, there may have been a definite unwillingness to reveal explicitly those mental and temperamental configurations characteristic of schizothymy.

3. The pattern of schizothymy might be relatively absent at this stage of adolescent development.

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[a] High mean scores here indicate low schizothymic trends.

3. *Ascendance*

In our material the athletosomes are significantly more ascendant than either the pyknosomes or leptosomes. It is clear that here we have a significantly close connection between ascendance and a particular type of physique, namely, athletosomic. It is a type of physique, namely, athletosomic. It is a type of physique which from the physical point of view is considered as most desirable and because either for esthetic reasons or for the development of muscular strength, it appears to be much more socially approved than either the pyknosomic or leptosomic type of body-build. Thus regarded as "good", the athletosomic physique is, in the light of our results in this section, associated with a trait or quality of personality that has a definite social value. While this correlation is not explicitly regarded as part of the Kretschmerian schema there is raised an interesting question whether the athletosomic physique is one that has a strong biological advantage over the two other physical types in relation to superiority of traits predominately social in nature.

TABLE 9

Personality variable	Constitutional type	N	M	σ_m	Comparison of	*Diff.* / σ_{diff}	Chances in 100 of a true difference greater than zero	Interpretation
	P	9	—8	4.33	P & L	9716	83	L is higher
Ascendance	A	25	5.4	2.86	P & A	2.5417	99.4	A is higher
	L	27	—3	2.76	A & L	2.1134	98	A is higher

4. *Emotional Sensitiveness to the Environment*[48]

Since a study of extant literature dealing with studies of person-

TABLE 10

Personality variable	Constitutional type	N	M	σ_m	Comparison of	*Diff.* / $\sigma_{diff.}$	Chances in 100 of a true difference greater than zero	Interpretation
Emotional sensitiveness	P	9	3.3	.12	P & L	1.5337	93	L is higher
to the environment	A	25	3.2	.06	P & A	.7669	77	A is higher
	L	28	3.1	.06	A & L	1.1755	87	L is higher

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[48] High mean scores here indicate this trait is present only to a slight degree

ality does not reveal any report of this pattern having been tested empirically and correlated with physique, it is not possible to compare our results with those found by other investigators in this field. This pattern represents a measure of an aspect of personality usually included in that of introversion. From an analysis of the questions which purport to indicate the presence of the factor it is clear that a person emotionally sensitive to the environment would be inclined to be withdrawing in his social attitude, rather meticulous in execution of detail, and unwilling to act on the spur of the moment. He would be persistent in any line of activity, more interested in intellectual matters than in athletics as well as being self-directive and emotionally inhibited. Let us see what are some of the characteristics of the schizoid personality, accepted by Kretschmer (37). Such characteristics include . . .

> the quality of timidity . . . . with its typical growth from the inhibition of the thought processes. . . . The timidity is, in these cases, a hyperaesthetic affective attitude at the entrance of a stranger into the proscribed autistic area of the schizoid personality (p. 159).

Further:

> We very frequently find quiet lovers of books and nature among the timid, dreamily tender schizoids . . . . Schizoid men, even of lowly origin, are universally lovers of books and nature, but it is with a certain eclectic accentuation. It is due to their flight from humanity, and their preference for all that is peaceful and unharmful (pp. 159-160).

Again:

> Schizoid men are either unsociable or eclectically sociable, within a small closed circle, or else superficially sociable, without deeper psychic rapport with their environment (p. 158).

In comparing the "good-natured" qualities of the cycloids with those of the schizoids the author states that

> the good-nature of the schizoid child on the other hand is manufactured out of the two components: timidity and affective lameness (p. 158).

Granting that the schizoid type is an abnormal manifestation of those qualities described as schizothymic, the similarity of the trends in the above descriptions and the characterization of a person possessing the unmistakable features of "emotional sensitiveness to the environment" is marked. We should expect a significant correspondence between this last named personality pattern and the constitutional correlate of a schizoid or schizothymic personality, namely, the leptosomic habitus.

From the above table (Table 10) it will be seen that the leptosomes are more emotionally sensitive to the environment than pyknosomes or athletosomes. The advantage for the leptosomes is not reliably significant.

5. *Social introversion*[46]

The general picture of an individual considered socially introverted according to this scale is one descriptively closer to the schizothymic type than to the cyclothymic.[47] For instance, the socially introverted would express himself better in writing than in speech, would not prefer to take the lead in group activities, and would not be inclined to act on the spur of the moment. Further, he shows considerable persistence in performing a task, works alone rather than with others, is more interested in intellectual things than in athletics, dislikes speaking before a large group, is inclined to be slow and deliberate in movement, does not enjoy meeting people, does not adapt easily to new situations, does not like to confide in others, and either cannot or will not express his emotions readily. The scores fail to indicate any difference between the pyknosomes and leptosomes other

TABLE 11

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
Social	P	9	2.9	.12	P & L	0	50	—
introversion	A	25	3.2	.08	P & A	2.0804	98	P is higher
	L	28	2.9	.08	A & L	2.6526	99	L is higher

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[46] High mean scores indicate this trait is present only to a slight degree.

[47] *Cf.* Page (56) who concluded that the asthenic patients tended to be more introverted than the pyknosomes. The Heidbreder and the Neymann-Kohlstedt tests of introversion-extraversion were administered to 50 manic-depressive patients and a like number of schizophrenic patients who were classified according to Kretschmer's types. On the contrary, Guilford & Guilford (23) are unwilling to grant that dementia praecox patients are extreme introverts.

than that expected by mere chance. While the chances are quite high that the leptosomes are more socially introverted than the athletosomes, the pyknosomes actually show an almost equally high probability that they are more socially introverted than the athletosomes.

TABLE 12

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
	P	9	2.1	.12	P & L	0	50	———
Extraversion	A	25	1.8	.08	P & A	2.0801	98	A is higher
	L	28	2.1	.08	A & L	2.6526	99	A is higher

6. *Extraversion*[48]

As already indicated, this trait was measured by both R. S. A. and R. S. B. and the questions diagnostic of social introversion were held in a sense to be significant of the presence of extraversion. It was assumed that introversion-extraversion form a single continuum. Hence a subject highly introverted socially would be correspondingly not extraverted and vice versa. Expressed another way, a subject who had five ratings of 1,1,2,3,1 on the 1-5 point scale in respect of the trait of social introversion would be rated as 5,5,4,3,5 on the same questions for the trait of extraversion. Thus whereas leptosomes and pyknosomes were more socially introverted than athletosomes the reverse holds true, so that athletosomes are significantly more extra-

TABLE 13[49]

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
Social attitude toward church	P	9	2.8	.37	P & L	.2302	58	P is higher
	A	25	2.9	.14	P & A	.2528	60	A is higher
	L	28	2.7	.23	A & L	.7423	76	A is higher

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[48] High mean scores here indicate this trait is present only to a slight degree.

[49] High mean scores indicate an increase in an unfavorable attitude towards the church.

verted than leptosomes and pyknosomes. There is no difference between the leptosomes and pyknosomes.

TABLE 14[60]

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Social attitude	P	9	4.0	.39	P & L	.2393	58	P is higher
toward war	A	25	4.1	.16	P & A	2172	58	A is higher
	L	28	3.9	.15	A & L	.9124	82	A is higher

TABLE 15[61]

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Social attitude	P	9	6.8	.32	P & L	1.1044	84	P is higher
toward Constitution	A	25	6.2	.16	P & A	1.6769	94	P is higher
of U. S. A.	L	28	6.4	.19	A & L	.8051	79	L is higher

7. *Social attitudes*

On the whole there appears to be little relationship between these social attitudes and physique represented by Kretschmer's three constitutional types. The pyknosomes are more loyal to the Constitution than the athletosomes but the mean scores of all three groups is still within that range of scores established as representing a neutral attitude.

8. *Intellectual leadership*

Previous studies concerned with the relationship between physique and leadership have failed to recognize the difference between various kinds of leadership. The diagnosis of intellectual leadership rested mainly upon teachers ratings together with an impression formed by

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[60] High mean scores indicate an increase in favorable attitude toward war.
[61] High mean scores indicate strong loyalty to the Constitution.

TABLE 16[52]

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Intellectual leadership	P	9	3.4	.35	P & L	.8242	79	P is higher
	A	25	3.6	.18	P & A	.5081	69	P is higher
	L	27	3.7	.10	A & L	.4857	67	A is higher

the interviewer; by both methods the diagnostic questions were of a direct nature. None of the differences between the constitutional groups is either marked or significant. It is quite possible that in judging intellectual leadership both interviewer and teacher did not have reliable criteria for estimating the differences between individuals in respect of this trait. At any rate, according to our results, our findings are not significantly positive.

TABLE 17

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Intelligence quotient	P	9	100	2.65	P & L	1.6946	94	L is higher
	A	24	101.2	2.00	P & A	1.2650	89	A is higher
	L	28	105.4	1.77	A & L	.4512	67	L is higher

9. *Intelligence.*

Many studies have been carried out to determine the degree of concomitance of physique and intelligence. Generally[53] the results have been slightly positive. Summing up the general situation Paterson (58) states that

> From the viewpoint of man in the mass, there is a definite, though slight correlation between physical development and

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[52] High mean scores here indicate this trait is present only to a slight degree.

[53] Murdock and Sullivan (51) report an investigation where the physical and mental data were collected independently and where care was exercised to use well graduated intelligence tests to cover a wide range of age levels. Only a slight positive relationship was shown to exist between intelligence and height and weight.

> mental development. From the point of view of individuals, the connection between physical characters and intellectual traits is so slight as to make it quite impossible in any given case to predict mental status, knowing physical status and vice versa (p. 157).

Unfortunately because of administrative difficulties, it was impossible to give intelligence tests to all the subjects in this particular study this year and rather than use the 1935 *IQ* scores for only some of our comparative groups and the 1934 scores for the remainder it was decided to consider the 1934 *IQ*'s for all subjects, hoping thereby to use uniform data. This procedure raises the question of the constancy of the *IQ*. Provided subjects are at least six years old at the time of the first testing, *IQ* changes are relatively small when further tests are given at periods varying from a few days to ten years. With unselected children variations of five points or less have been found in one half of the number of cases. It is reasonable to assume that for the purpose of this investigation the 1934 *IQ* scores are sufficiently reliable and constant to be considered with the 1935 physical data.

In relation to the athletosomes and pyknosomes, the leptosomes are superior in intelligence although the advantage is in neither case significantly high; the greatest difference is between pyknosomes and leptosomes. This superiority of the leptosomes favors the claims of Naccarati and others who have contended that microsplanchnics—roughly equivalent in bodily build to that of the leptosomes—tend to have high intelligence quotients when compared with macrosplanchnics (52-53). From a consideration of the clinical pattern of the schizothyme one would expect a higher degree of interest in intellectual pursuits than in the case of the cyclothyme whose most satisfying interests are obtained from contacts with persons. Here the

TABLE 18

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
Social leadership	P	9	3.7	.34	P & L	.5593	71	P is higher
	A	25	3.3	.15	P & A	1.0764	85	A is higher
	L	28	3.9	.11	A & L	3.2101	100	A is higher

leptosomes are superior to the athletosomes in intelligence, social introversion and schizothymic trends, a combination of results that would tend to support the expected relationship between leptosomic build in the Kretschmerian sense and intelligence in general.

10. *Social leadership*[54]

As in the case of intellectual leadership, the questions diagnostic of this pattern were direct. The most striking and clear cut difference between any of the group is that between the athletosomes and the leptosomes with a pronounced superiority in favor of the athletosomes. The members of this group are also more markedly social leaders than the pyknosomes. These results again emphasize the possibility of the determining influence of the "good" physique among adolescents and the formation of social traits or social personality patterns.

TABLE 19

Personality variable	Constitutional type	N	M	σ_{m}	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
Introversion (Bernreuter)	P	9	-61.9	3.93	P & L	.3258	62	L is higher
	A	25	-51	9.12	P & A	.6797	74	A is higher
	L	27	-62	7.35	A & L	.6767	71	A is higher

11. *Introversion*

This pattern was measured with the Bernreuter *Inventory* and the relationship between it and the physical types investigated to enquire if there were any corroboration of the evidence revealed from a consideration of the pattern of social introversion as measured by a different scale. From our results here we find that on the whole the differences between any two groups are relatively insignificant. We tend to confirm the Kretschmerian hypothesis, provided we assume that introversion is to be identified with the schizothymic pattern.

12. *Personal adjustment*[55]

This term, along with that of "social adjustment" is admittedly a vague one. The personality adjustment score

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[54] High mean scores here indicate this trait is present only to a slight degree.

[55] High mean scores indicate satisfactory personal adjustment.

> is based on 50 questions[36] which deal with an individual's self-estimate on happiness and feeling of security and freedom from worry and anxiety.

Social adjustment is interpreted from answers to . . .

> 40 questions[36] dealing with matters of social contact and its enjoyment, and the absence of tendencies toward withdrawal and isolation. The score is largely a measure of extroversion.

TABLE 20

Personality variable	Constitutional type	*N*	*M*	σ_M	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Personal adjustment	P	9	18.2	.66	P & L	.3650	64	L is higher
	A	25	19	.62	P & L	.8834	80	A is higher
	L	28	18.5	.49	A & L	.6327	73	A is higher

According to the questions in the test the personally well adjusted person is one who considers himself happy and good-natured, does not feel ashamed because of illness or sickness, is considered by friends as one with strong nerves, does not worry about things that have happened, does not become upset when scolded, does not consider himself a nervous person, does not feel self-conscious because of personal appearance and feels equally at ease in the presence of contemporaries of either sex. According to our results, the chances of a significant difference existing between the three groups are not very

TABLE 21

Personality variable	Constitutional type	*N*	*M*	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Social adjustment	P	9	14.3	.94	P & L	.6772	74	L is higher
	A	25	15	.63	P & A	.6186	73	A is higher
	L	28	15	.43	A & L	0	50	

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[36] Only Part II of this test was given. Hence only 25 questions were given to the subject in the case of personal adjustment and 20 in the case of social adjustment. Evidently the test overlooks the possibility that an introverted person can be quite well adjusted socially.

high, although the athletosomes are apt to be more adjusted personally than either the pyknosomes or leptosomes. According to the average scores based on the records of 280 individuals, high school students had an average score of 32.2 (σ=8.8) for both parts of the test (Maller, 45). The *approximate* mean score for one part would be 16.1, a figure considerably below the means for all three of our constitutional groups. On the basis of this evidence the general personal adjustment of the subjects may be considered satisfactory. While none of the differences between any of our three constitutional groups is significantly high, yet there is a trend in the direction of athletosomic superiority.

13. *Social adjustment*[57]

The difference between any two of our selected groups is not marked; athletosomes are somewhat more adjusted socially than pyknosomes, and leptosomes more than pyknosomes. The average scores of the athletosomes and leptosomes are identical. On the whole the evidence for the superiority of any group is inconclusive.

TABLE 22

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
	P	9	3.0	.18	P & L	0	50	—
Competitiveness	A	25	2.7	.15	P & A	1.2804	89	A is higher
	L	28	3.0	.11	A & L	1.6121	94	A is higher

14. *Competitiveness*[58]

The questions referring to this behavior pattern were designed to cover the possibilities of an individual being competitive both inside and outside the class room. Judgments were obtained from teachers and subject by means of the rating scales and from the subject during the personal conference. The mean scores of the pyknosomes and leptosomes are identical, hence the chances are that there is no true difference between these groups. Although the athletosomes are more competitive than either the pyknosomes or leptosomes the most reliable difference exists between the athletosomes and the leptosomes. Here again we have additional evidence in support of a possible theory of the concomitance of bodily fitness and personality patterns or traits of high social value.

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[57] High mean scores indicate satisfactory social adjustment.

[58] High mean scores here indicate this trait is present only to a slight degree.

TABLE 23

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
Talkativeness	P	9	2.8	.28	P & L	.6479	74	P is higher
	A	25	2.9	.16	P & A	.3101	62	P is higher
	L	28	3.0	.13	A & L	.4850	67	A is higher

15. *Talkativeness*[59]

As in the case of the diagnosis of competitiveness, talkativeness was discerned by means of the rating scales and the personal conference. Our results show no marked differences, although the pyknosomes tend to be more talkative than either athletosomes or leptosomes. In a sense these findings tend to confirm Kretschmer, for the pyknosomes with their more sweeping and labile sociability would be expected to be expansive and outgoing in their expressiveness.

TABLE 24

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
Creativeness and imagination	P	9	3.6	.32	P & L	1.7730	96	L is higher
	A	23	3.2	.13	P & A	2.6057	99.5	A is higher
	L	28	3.4	.11	A & L	1.7616	96	A is higher

16. *Creativeness and imagination; responsibility; influence*[60]

Since these patterns were measured according to the same plan and the diagnostic questions were presented to the teachers in one group, they will be discussed in the same section.

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[59] High mean scores here indicate this trait is present only to a slight degree.

[60] All measured by means of the Trait Study.

(*a.*) *Creativeness and imagination.*

Our results show that the athletosomes are superior to leptosomes and pyknosomes in this trait. Since all the information regarding the traits of creativeness and imagination, influence, and responsibility was obtained solely from teachers' ratings, it is difficult to determine the criteria employed by the raters when making their decisions.

TABLE 25

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
	P	9	2.6	.24	P & L	1.7999	96	P is higher
Responsibility	A	23	2.0	.25	P & A	1.7310	96	A is higher
	L	27	3.1	.14	A & L	3.8394	100	A is higher

(*b.*) *Responsibility*

The degree of responsibility and resourcefulness required of a subject with a rating of 1 on the 1-5 point scale would be essentially that required by the qualifications of the same subject were he given a similar rating in the pattern of social leadership. It is not surprising that we have further evidence to reinforce the theory of constitutional advantage regarding social traits or those traits which depend considerably on a social environment for their development. The athletosomes are more likely to be more responsible and resourceful than either pyknosomes or leptosomes; compared with the leptosomes, they are significantly superior.

(*c.*) *Influence.*

The ratings here concerned the degree of effectiveness of influence

TABLE 26

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
	P	9	3.8	.32	P & L	.2982	62	L is higher
Influence	A	23	3.1	.14	P & A	2.0040	98	A is higher
	L	28	3.7	.10	A & L	3.4884	100	A is higher

rather than the direction in which influence was felt. Whether the influence of a subject was of an anti-social nature outdoors or of a nature disturbing to discipline within the class room was not considered. In a sense, judgments made within this category of behavior are likewise judgments on social and intellectual leadership and possibly also on ascendance. The advantage of the athletosomic physique is again shown where athletosomes are superior to pyknosomes and leptosomes.

TABLE 27

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff}}$	Chances in 100 of a true difference greater than zero	Interpretation
Socio-economic status	P	9	37	4.30	P & L	0	50	....
	A	25	44	2.25	P & A	1.4261	92	A is higher
	L	28	37	2.24	A & L	2.2014	98.6	A is higher

17. *Socio-economic status*[61]

Any difference that might exist between pyknosomes and leptosomes concerning their social and economic status is apparently just what would be expected by chance. Athletosomes, however, belong to a higher socio-economic level than either leptosomes or pyknosomes. So far as can be ascertained no studies have been published concerning the economic status of the three Kretschmerian constitutional groups. With a standardised test administered under reliable conditions we have evidence that one of the groups is markedly different from the other two. Whether both sets of data, those pertaining to socio-economic status and constitutional build, can be similarly interpreted on an hereditary biological basis is another speculation, no reliable answer to which seems to be evident from a consideration of our data.

18. *Self control*[62]

The scores on this test show that the pyknosomes and the athletosomes are more self controlled than the leptosomes. While none of the differences is significantly high, there is at least a trend in the direction of a type of physique possessing superior biological fitness associated

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[61] High scores indicate superior socio-economic status.

[62] High mean scores indicate superior self control.

TABLE 28

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Self control	P	9	17.2	.62	P & L	1.8693	96	P is higher
	A	25	16.6	.48	P & A	.7652	77	P is higher
	L	28	15.6	.59	A & L	1.3148	90	A is higher

with a higher degree of self control. According to the test questions, a self controlled individual would be one who is patient, is able to keep secrets, is not easily discouraged, has plenty of self confidence, does not become easily upset, does not become excited before an examination, and does not change his hobbies and interests quickly.

Summarizing the results of these comparisons, we find that compared with the leptosomes, the athletosomes are more ascendant, extraverted, responsible, cyclothymic, and more influential among their school contemporaries. They are also more readily acknowledged as social leaders and are more likely to come from a higher socioeconomic level. The athletosomes are also more ascendant, more creative and imaginative, and less socially introverted than the pyknosomes. No significant differences existed between the leptosomic and pyknosomic constitutional groups in regard to any of the personality variables.

SUMMARY

1. Nine pyknosomes, 28 leptosomes and 25 athletosomes were selected from the total population on the basis of subjective estimate. Only those subjects were considered to be validly diagnosed where there was at least 80 per cent agreement among five judges and 100 per cent agreement when there were 5, 4 or 3 judges.

2. Although the personality characteristics of athletosomes and leptosomes are classified together by Kretschmer, significant differences have been found to exist between these two groups.

3. Although the personality characteristics of leptosomes and pyknosomes are contrasted as opposite poles by Kretschmer, few significant differences of personality patterns were found to exist between these two constitutional groups to support this view.

4. In view of the evidence adduced in this section of the investi-

gation, it is clear that contrary to Kretschmer, athletosomes should not be classified with leptosomes in respect to their personality patterns; on the contrary the personality characteristics of the athletosomes more closely resemble those of the pyknosomes, although differences were found to exist between these two last named groups with respect to three personality variables.

5. Consistent results are obtained when social introversion and schizothymic trends are measured with different techniques and diagnostic instruments. In both cases leptosomes are more socially introverted and more schizothymic than athletosomes. Social introversion and schizothymic trends seem to have a close relationship.

6. Consistent results are obtained when extraversion and cyclothymic trends are diagnosed by different procedures. In both cases athletosomes are more cyclothymic and extraverted than either pyknosomes and leptosomes. Cyclothymic trends and extraversion would seem to have a close relationship.

7. A most striking superiority of the athletosomes over both the other groups in regard to such traits or patterns as competitiveness, influence, ascendance, social leadership, cyclothymic pattern and extraversion provides sufficient evidence to postulate a theory that constitutional advantage or "good" physique is a strong determinant of traits fundamentally social in genesis and development. This theory of constitutional advantage has no affinity with the Kretschmerian theory that with the pyknosomic physique there are associated cyclothymic traits, and with the leptosomic and athletosomic type of constitutional build, schizothymic traits are manifested.

8. The theory of constitutional advantage lends support to Terman's (66) findings concerning a superior coherence of physical and social traits.

IV. THE SIGNIFICANCE OF CONSTITUTIONAL INDICES IN DIAGNOSIS

As an approach to a better understanding of the problem of the relationship between physique and personality, the search for adequate morphological criteria has been important in the researches of medical clinicians; these investigators have been interested in determining the degree and nature of the correspondence between somatic structure and psycho-pathological aberrations of personality.

Hackel (25) has classified the many theories dealing with constitutional types as follows:

1. External form and total body measurements (Körpermasse).
2. Gross proportions of a single organ and its system.
3. Preponderance of a definite anatomical feature, e.g., a physiological system (Hippocrates, Sigaud, Di Giovanni).
4. Proportion of interwoven elements.
5. Certain predominant physiological conceptions, such as a partial congenital inferiority, weakness, and uselessness of a single organ (Martius).
6. Functional basic characteristics (Di Giovanni).
7. Muscular tonus.
8. General ability the organism has for work.
9. Quickness and energy of movement.
10. Prevalence of anabolic and catabolic processes.
11. Correlation between certain general states with the hypo- or hyper-functioning of the internal secretory organs.
12. Predominating influence of the parasympathetic or sympathetic system. Predominance of the reflective over the conscious acts.
13. General biological and genetic viewpoint (Bean, Bryant, Bartel, Bogomolez, Hart, Mathes, Bunak).
14. Prevailing disposition corresponding to different illnesses; compare the medical viewpoint of the past (Hippocrates) and the constitutional types in present day literature (Di Giovanni, Rokitansky, Gower, Beneke, Viola, Bartel, Kretschmer, Hart).

Various attempts have been made to construct constitutional indices that will satisfactorily separate individuals according to the Kretschmerian typology. Generally, the most successful efforts have resulted when the various constitutional types were *seen* to be the most evident, namely among psychotic adult patients. The use of any constitutional index is to be cautiously evaluated. On the one hand, when such an index is found, it is an issue whether it can be used to differentiate the types without supporting or reinforcing evidence; on the other hand, there is the question of the degree to which such an index can be used merely to supplement or be a clue to clinical observations in the typical identifications.[43] Another important point is to enquire how far in the age scale and among what types of populations can such an index be reliably used for either or both of the above mentioned purposes.

Kretschmer originally used absolute measurements as aids in the clinical differentiation of types. But it is obvious that some absolute measures are unsatisfactory for the differentiation of constitutional types: they tell very little about the general morphological structure of the organism. An index of constitutional build should indicate relationships between significant bodily segments and particularly those which are apt to express developmental differences. For instance, most reliable investigators agree upon the futility of using the cephalic index for differentiating constitutional types. However, Kretschmer does consider the general facial configuration as having an important relationship with other features of the bodily structure.

Nissen (54) studied the head development of 928 boys and girls of whom 78 per cent were Russians and 14 per cent were Jews, and formed conclusions concerning the cephalic indices of leptosomes and eurysomes. While he does not suggest the use of the index for separating his types, he does stress the importance of differences in form of the "Gesichschädel" in his two constitutional groups. But his statement that "up to the conclusion of the stage of puberty the head develops more in length than in breadth" is contradicted by a close analysis of the carefully recorded measurements made by Meredith (46). According to the latter, Nissen's statement would be true in the case of children up to the age of 3 years 3 months, but from this stage onwards and particularly from the age of 5 years 9 months the annual rate of percentage increment of growth in head length and that in head breadth remains fairly constant. Perhaps the difference between the findings of the German and the American investigators may be due to the racial composition of the subjects or to the techniques used in the respective investigations.

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[43] Westphal (75) remarks that "for the pure empiricist, an index, at the best, is only an abstraction of a part of the sum total of all the biologically important points.'

Meredith's researches were conducted in connection with a study of the rhythm of physical growth. Some 93,000 anthropometric values for 1,243 male children and adolescents in Iowa City extending over a period of 14 years were taken as the data for his investigation. It is very difficult to reconcile Nissen's findings with those of Meredith who states that

> The coefficients for head length and breadth show very little change during the years from five to eighteen. There is a slight decrease with age which suggests that the groups tend to become more homogeneous with respect to these measurements (p. 55).

From the welter of investigations concerned with constitutional indices which might be favorably related to clinically determined types, it appears that the fundamental ideas of Di Giovanni (12) have been most fruitful. More interested in the phenotypical than in the genotypical patterns of constitutional build, he believed that the most adequate approach to understanding an individual was an examination of the relationship between the length of limbs and the size of the bodily cavities.

> The conception of the individual constitution is obtained from the individual Morphological Combination (p. 414).

and

> Every individual represents a morphological variation of the type to which the anatomical and physiological averages cannot be applied (p. 416).

Hence

> The relations of development of the visceral cavities—thorax and abdomen—in respect to the skeletal height indicate that excess and that defect in the evolution of the parts just referred to. Therefore by means of suitable measurement of the body one can arrive at the knowledge of the development of the parts (p. 415).

Naccarati's index[61] has been used extensively but as Wertheimer and Hesketh have indicated, there are several pointed objections to its use as a valid classificatory device: these primarily concern the technique of obtaining the measurements. However, since Naccarati has substituted for his original formula, the height weight ratio, most studies of the possible relationship between the morphological index and personality variables have used the simpler ratio.

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[61] Morphological Index $\dfrac{\text{Length of Extremities}}{\text{Trunk Volume}}$.

Although constitutional medicine is more concerned with the individual than with the group, there seems to be no limit to the extent to which different constitutional types can be set up with a corresponding number and variety of correlations with formidable arrays of constitutional indices. Considerable differences of opinion exist concerning the universal efficacy of any particular index in separating different types of constitutional build.

Working in Leningrad, Tschernorutzky (70) uses a schema whereby he recognizes three types, two of which are extremes and the third intermediate. One is what he calls the "asthenic" corresponding to the asthenic or leptosome types of Kretschmer, the respiratory or cerebral type of Sigaud, and the microsplanchnic types of Viola and Pende. Another is the "hyperasthenic," corresponding to the pyknosomic type of Kretschmer, the digestive type of Sigaud and the macrosplanchnic types of Viola and Pende. The third and last is called the middle type or "normosthenic," corresponding to the athletosomic type of Kretschmer and to the muscular type of Sigaud. Tschernorutzky proceeds to state that the Pignet index[35] is used as an objective means of differentiating these types, giving its limiting values to determine the two so-called fundamental types. Then on the basis of this indicial determination of the three types outlined above, investigations were carried out at the instigation of Tschernorutzky, and by Belowa, Koltowskaja and Pliner to determine the differential rates of blood pressure within the three "typical" groups; by Kogan in the estimation of the varying degrees of "vital capacity" (Vital kapazität); by Alexejew and Liwschin in studying the constant quantitative and qualitative differences on the part of the white corpuscles in individuals belonging to these types, and by other workers in making researches upon glycemia, the diastatic energy of the blood, fat metabolism, isohemoagglutination and so on.

Wertheimer and Hesketh draw attention to three pertinent criticisms of the Pignet Index and substantiate their chief criticism by referring to the records of three of their mental patients whose weight changed considerably during the course of their developmental phases; these differences in weight over different periods meant that according to the correspondingly changed Pignet Index the patients would be shifted from one constitutional group to another. Yet in a study of a group of 153 male students in New York City with an average age of 19 years and 10 months, Klineberg, Asch and Block (31) state that of five indices the Pignet Index differentiated their groups of pyknics and leptosomes most clearly. Farr (17) also considers it to be the most reliable of some 75 indices whose diagnostic significance he investigated. In an evaluation of several indices Burchard (7) criticises the inclusion of trunk height in the Wertheimer-Hesketh Index on the grounds that instead of revealing the morphological characteristics of Kretschmer's three types, this index conceals them. According to Wigert (76) the Wertheimer-Hesketh index has only limited value; he therefore modifies it and finds that it then differentiates between pyknosomes and leptosomes when women are used as subjects. He finds a considerable amount of overlapping of the athletosomes in both of the pyknosomic and leptosomic groups.

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[35] P. I. = Statute (cm.) — [chest circumf. (cm.) + wt. (kgm.)].

Concerning the validity of the so called Marburg Indices, *A*, *B*, and *C*, all of which involve shoulder breadth, Westphal (75) found the first named to be useful in separating leptosomes from athletosomes. Index *B*, representing another modification of the Wertheimer-Hesketh index was found by Westphal to be satisfactory in classifying the leptosomes and athletosomes, but the pyknics overlapped both groups. He reported that Index *C* is useful in clearly separating the athletosomes from the leptosomes. Evidently these three Marburg Indices are useful in differentiating the athletosomes and leptosomes, but are of little value when the third division of pyknosomes are considered. Wigert, however, did not share the same views concerning the value of these indices. Thereupon he devised three additional indices called "Stockholm 1, 2, and 3" respectively. The second one,[60] divided his subjects into two groups, "leptothorakals," those with a narrow chest cavity in relation to leg length, and the "pyknothorakals," who had more spacious chest cavities. Among men he found this classification separated pyknosomes from leptosomes. Although he found a rather satisfactory agreement between the clinically determined classifications and those anthropometrically determined groups, the greatest discrepancy occurred in the case of the athletosomes particularly when women were concerned. He raises the question whether athletosomes exist as a group distinct from the other physical types. Wigert's subjects were 119 men and 122 women attending a psychiatric clinic in Stockholm during a three-month period; Westphal's investigations were carried out with "439 pure physical types selected from 702 men, all of whom were fully measured and described" (p. 421). Wertheimer and Hesketh's subjects consisted of "65 patients at random without any consideration of diagnosis or physical habitus. The patients were taken from the wards of the Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital, and from the Spring Grove State Hospital, Catonsville, Maryland" (p. 10).

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[60] $\frac{\text{Leg length}^2 \times 10}{\text{Chest transverse diameter} \times \text{chest saggital diameter}}$.

In our study we are compelled to define the limits of choice of indices. The small variety of measurements taken over a period of twelve years would only permit a few combinations of possible worthwhile value. The purpose of using the indices (somametric diagnosis) was to separate certain physical types not necessarily designated as pyknosomes, leptosomes and athletosomes, and to determine the degree of correspondence between these types and certain aspects of personality. The following measurements and indices were used:

1. The measurement of height, hereafter denoted as P_1.
2. The measurement of weight, hereafter denoted as P_2.
3. The height-weight ratio, hereafter denoted as P_3.
4. The Wertheimer-Hesketh index.[97] This index was devised and subsequently certified by its authors to be the most suitable index they found for the classification of Kretschmer's three constitutional types; this will be hereafter referred to as P_4.
5. The K-A-B index.[98] This index was claimed by Klineberg, Asch and Block to be valid for the separation of Kretschmer's types, pyknosomes and leptosomes, when normal subjects were used. It will be subsequently referred to as P_5.

After every index value for each subject had been computed, it

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[97] $$\frac{\text{Leg length} \times 10^3}{\text{Transverse chest diam.} \times \text{Saggital chest diam.} \times \text{trunk height.}} \times 100.$$

[98] $$\frac{\text{Standing height}^2}{\text{Sitting height} \times \text{weight}},$$

was recalculated. To guard against possible errors in transferring the individual measures from the first sheets to P.C.C. 2, all figures so transferred were checked. When the original measurements were taken it was necessary for two persons to take the same measurements on each child. When the second measurement was noted, the recorder compared it with the first and the subject was sent to a third measurer if a difference greater than five millimeters existed between the first two measures. When all the measurements were recorded, a final inspection of the record card was made by a special assistant. Even with these precautions Lincoln (43) has indicated the degree of unreliability that crept in when certain indices such as $\frac{\text{trunk length}}{\text{leg length}}$ and $\frac{\text{standing-sternal}}{\text{leg length}}$ were computed. Since the measures of height and weight were calculated correct to the first decimal place it was considered that the last digit should be recognized as part of the index; hence for P_1 and P_2 the decimal point was discarded as a matter of convenience and the number of significant figures in these two indices accordingly was four and three respectively.

Summary

1. In most of the investigations hitherto conducted, subjects have belonged either to groups composed of institutional patients or they have been classified on the basis of an investigation of psychotic and psychopathic personality disorders.
2. It is extremely difficult to discover any consistency of agreement among investigators concerning the *limiting values* of indices for the differentiation of constitutional types. There is considerable overlapping between constitutional groups when many different indices are used in the differentiation of clinically observed types.
3. In view of the paucity of reliable norms and the relatively untouched field of investigating the use of indices in separating personality types with normal adolescents as subjects, considerable amount of research has yet to be undertaken before a considered judgment can be expressed upon the diagnostic value of the use of such indices.
4. In most European studies the factors of age and racial variability have not been adequately controlled.

5. In order to investigate the problem of relationship between personality and physique, five constitutional measures designated as P_1, P_2, P_3, P_4, P_6, will be used to differentiate groups of subjects on a physical basis. *Henceforth, in this section of the investigation* the Kretschmerian classification of pyknosomes, athletosomes and leptosomes will be abandoned.

6. As much care as possible was taken to ensure accuracy of computation of the indices and measurements used in this section of the study.

In order to conduct a thorough-going investigation of the proper significance of any constitutional index for the purposes of diagnosis, it would be necessary to make an extensive study employing many different indices on a large number of people concerning whom the measurements would be taken by the same technique at regularly recurring periods. Factors such as sex, age, race, and disease would have to be held as constant as possible and each individual observed over a long period of time to take into consideration fluctuations of weight, height, and general skeletal development which on the basis of other phylogenetic studies had been observed to characterize cycles or rhythms of growth.

V. THE RELATIONSHIP BETWEEN EXTREMES OF PHYSIQUE AND QUALITIES OF PERSONALITY

Selection of Subjects

To ensure that we are using only extreme cases in our comparisons, we have considered the serial distribution of all the values of each constitutional measure in turn as well as the scores or ratings of each of the personality variables. If, for example, we arrange the values of P_1 this way, it is easy to determine which are the tallest and which the shortest subjects in the total population; in the same manner it is easy to indicate which subjects are the heaviest and which the lightest when the serial distribution of P_2 values is considered. The same is true of the scores or ratings made in respect of each of the 19 personality patterns, the scores obtained on the scale for measuring socio-economic status, and the intelligence quotients. Thus, by arranging in serial order the scores made on the ascendance-submission test, it is possible to indicate those subjects who are extremely ascendant and those who are markedly submissive. By this procedure we are able to make comparisons between groups of extreme cases of physical build as indicated by each of the five constitutional indices and measurements, and groups of subjects who are ranked as extremes in the selected personality variables. The types of physical build are thus determined more objectively than in the case when we compared the performances of the pyknosomes, leptosomes, and athletosomes.

Two different procedures in assembling the data were adopted in regard to the general problem of relationship between certain personality patterns and physique.

Procedure A

1. *The highest 10 per cent*[60] of the subjects' *measurements or indices* arranged in order in a distribution within any one panel, e.g.,

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[60] It was not always possible to use the number of cases represented by exactly 10 per cent of the total population within each constitutional or personality panel. In some cases the 21st subject who normally might have been the last subject within the highest decile was one of several who all had the same score or rating. In such instances the number of subjects whose scores or indices were nearest that of the 21st subject was chosen as the most suitable. Sometimes this was as high as 25 and at other times as low as 12.

P_1, were taken and the personality pattern scores of the same individuals recorded.

2. *The lowest 10 per cent* of the subjects' *measurements or indices* arranged in order in a distribution within any one panel, e.g., P_1, were taken and the personality pattern scores of the same individuals recorded.

Procedure B

1. *The highest 10 per cent* of the subjects' *scores on the tests for the personality variables* arranged in order in a distribution in any one personality panel were taken and the constitutional indices of the same individuals noted.

2. *The lowest 10 per cent* of the subjects' *scores on the tests for the personality variables* arranged in order in a distribution in any one personality panel were taken and the constitutional indices of the same individuals noted.

With the adoption of Procedure *A* the purpose was to compare the personality scores and to enquire whether there was a significant difference between the scores representative of those individuals who were in the highest and lowest deciles of each of the five panels of constitutional indices and measurements.

By the adoption of Procedure *B* the process was reversed; that is, here the purpose was to compare the indices or measurements and to enquire whether there was a significant difference between these indices or measurements representative of those individuals who were in the highest and lowest deciles of each of the panels of personality patterns. This procedure was not adopted in the case of P_1 and P_2 with the use of the $\frac{diff.}{\sigma_{diff.}}$ method, as it was considered that if any reciprocal relationship existed between stature and personality patterns on the one hand and between weight and the same patterns on the other, it would be revealed in a consideration of the results dealing with the relationship between the height/weight ratio (P_3) and the same patterns. When the duplication method was used the data were arranged according to both procedures.

STATISTICAL METHODS

Two statistical methods were employed in dealing with the data:[10]

1. The $\frac{diff.}{\sigma_{diff.}}$ method already used in the first section of this report.

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[10] Since no significant differences were shown to exist between the contrasted constitutional groups in respect to the social attitudes on war, the

2. The use of a specially devised duplication formula. By means of this we are able to determine how many times in 1000 there is a probability of the occurrence of a certain number of duplications in two sets of data. In each case we wish to enquire what is the probability of the occurrence within a certain interval in one distribution (say of the values of a constitutional index) of subjects who are already within the corresponding interval of a distribution of personality-variable scores. The formula is as follows:

$$P_{n_2-i} = {}_{n_2}C_{n_2-i} \frac{(n_1)^{n_2-i}(N-n_1)^i}{(N)^{n_2}}$$

where

P_{n_2-i} = probability that n_2—i individuals who appear in the interval of the first distribution will appear in the interval of the second distribution.

N = population of both distributions.

n_1 = number of individuals in the specified interval of the first distribution (e.g., personality scores).

n_2 = number of individuals in the corresponding interval of the second distribution (e.g., constitutional index values).

${}_{n_2}C_{n_2-i}$ = number of combinations of n_2 things taken n_2—i at a time.

The significance of a given result will be interpreted in terms of the probability of n_2—i or more duplications. The probability is given by the sum,

$$\sum_{i=0}^{i=n_1-j} P_{n_2-i} \qquad \text{where } j = n_2 - i$$

For the sake of convenience, the probability ratio (*P.R.*) is expressed in terms of the probability that a certain number of duplications or more are due to chance so many times in 1000. For example, when

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church, and the Constitution of the U. S. A., when investigated with the application of the $\frac{diff.}{\sigma_{diff.}}$ method, these variables were neglected when the duplication formula was applied to the data. Together with "talkativeness," these social attitudes were not considered with the adoption of Procedure *B* *since no significant differences are shown to exist between the contrasted* constitutional groups by the application of the $\frac{diff.}{\sigma_{diff.}}$ formula.

$N = 172$, $n_1 = 25$, $n_2 = 19$, and the number of duplications is five, the P.R. would be 118/1000; again when $N = 186$, $n_1 = 24$, $n_2 = 19$, and the number of duplications is seven, the *P.R.* would be 4/1000; with the same date one duplication would be represented by a *P.R.* of 937/1000.

The following example illustrates the general procedure with the constitutional value P_2 and the personality variable "Cyclothymic pattern."

1. The highest 10 per cent of the values for this index are listed together with the corresponding identification numbers of the subjects.

2. The highest 10 per cent of the distribution of cyclothymic pattern scores are listed together with the corresponding identification numbers of the subjects.

3. The next step is to find what identification numbers fall within both groups. In Table 29 these are checked in the columns

TABLE 29

CLASSIFICATION OF SUBJECTS IN HIGHEST 10 PER CENT OF DISTRIBUTION OF P_1 SCORES AND OF "CYCLOTHYMIC PATTERN" SCORES

Highest 10 per cent of the distribution of P_1 scores. (Subjects' identification numbers in parentheses)	Highest 10 per cent of distribution of "cyclothymic pattern" scores. (Subjects' identification numbers in parentheses)
901 (35) x	1.5 (194)
877 (66)	1.7 (90)
858 (46)	1.8 (189)
844 (38) x	1.9 (20) x
822 (212)	1.9 (38) x
800 (204)	1.9 (146)
796 (59)	2.0 (35) x
783 (39)	2.0 (12)
780 (20) x	2.1 (18)
766 (86)	2.1 (62)
765 (52) x	2.1 (106)
763 (178)	2.1 (139) x
757 (51)	2.1 (143)
755 (36)	2.2 (52) x
754 (22)	2.2 (73)
745 (171)	2.2 (104)
742 (166)	2.3 (177)
741 (139) x	2.3 (60)
	2.3 (79)
	2.3 (141)
	2.3 (209)

thus, *x*. Here we find that there are five subjects who are at the same time among the heaviest 10 per cent and the 10 per cent most cyclothymic of the total population.

4. By computation from our formula we find that where we have five duplications or more the probability that this occurrence would arise by chance is 36 times in 1000; in other words, the *P.R.* is 36/1000.

This technique can be applied in a consideration of any two sets of data where one pertains to physique and the other to any personality variable. Thus it can be used when the data is arranged according to either Procedure *A* or *B*.

Schema 1 outlines the possibilities of comparing the decile groups.

SCHEMA I

SCHEMA FOR COMPARISONS OF EXTREMES OF PERSONALITY-PHYSIQUE GROUPS

$$\begin{tikzcd}
\text{Highest 10 per cent of Index Values} & A \arrow[r, leftrightarrow] \arrow[dr, leftrightarrow] & B \arrow[dl, leftrightarrow] & \text{Highest 10 per cent of Personality Scores} \\
\text{Lowest 10 per cent of Index Value} & Z \arrow[r, leftrightarrow, dashed] & Y & \text{Lowest 10 per cent of Personality Scores}
\end{tikzcd}$$

Comparisons are thus possible in either a horizontal direction, in which case the Probability Ratio (*P.R.*) would be expressed as *AB* or *ZY*, or in the diagonal direction when the *P.R.* would be either *AY* or *BZ*. The smaller the *P.R.* the fewer the number of duplications expected to arise by chance, and vice versa. If there were a significant relationship between personality and physique in respect of the variables chosen, we would expect to have a $\begin{matrix}\nearrow\text{low}\searrow\\ \searrow\text{high}\nearrow\end{matrix}$ *A.B.* *P.R.* and a correspondingly $\begin{matrix}\nearrow\text{high}\searrow\\ \searrow\text{low}\nearrow\end{matrix}$ *BZ* *P.R.* Conclusions formed on the basis of these data would be reinforced by a $\begin{matrix}\nearrow\text{low}\searrow\\ \searrow\text{high}\nearrow\end{matrix}$ *YZ* *P.R.* and a $\begin{matrix}\nearrow\text{high}\searrow\\ \searrow\text{low}\nearrow\end{matrix}$ *AY* *P.R.*[11]

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[11] It is assumed that if a trait is associated with one extreme type of

Thus we find that within the P_8 category on the one hand and the personality category of cyclothymic pattern on the other, the *AY* *P.R.* is 61/1000. Remembering that in the *Y* group are those subjects who are least cyclothymic (lowest 10 per cent of the distribution of cyclothymic pattern scores), and that in the *A* group are those who are leptoid in physique (highest 10 per cent of the distribution of P_8 index values), we see that the probability there is a chance duplication of the same subjects in both groups is only 61 in 1000. The *BZ P.R.* is 45. Those subjects who are *most* cyclothymic (highest 10 per cent of the distribution of cyclothymic pattern scores) are in the *B* group, while in the *Z* group are those who are pyknoid in physique (lowest 10 per cent of the distribution of the P_8 index values). Then the probability that there is a chance duplication of the same subjects in both groups is only 45 in 1000, a figure that approximates the *AY P.R.* of 61/1000. The chances are therefore reasonably high that relatively the leptoids are least cyclothymic and the pyknoids are most cyclothymic. Further, since the *AB* P.R. is 1000/1000 we have little evidence to suppose that leptoids are cyclothymic, but since the *BZ P.R.* is 45/1000, we should expect the chances to be great for pyknoids to be cyclothymic. In short to have consistent results when we have a high *AB* or *YZ* *P.R.* we should expect confirmatory low *AY* and *BZ P.R.*'s.

The tabulation of our results derived from the data arranged by Procedures *A* and *B* illustrates how the conclusions can be coordinated and how it is possible for one procedure to check the results of the other (Schema 2).

SCHEMA 2

Procedure *A*		Procedure *B*
Pyknoids are →	the most cyclothymic	
	the least cyclothymic	→ are the leptoids.
Pyknoids are →	the most extroverted	
	the least extroverted	→ are the leptoids.
Pyknoids are →	the most influential	
	the least influential	→ are the leptoids.
Pyknoids are →	the superior social leaders	
	the inferior social leaders	→ are the leptoids.
Pyknoids are →	the superior intell. leaders	
	the inferior intell. leaders	→ are the leptoids.
Pyknoids are →	the least schizothymic	
	the most schizothymic	→ are the leptoids.
Pyknoids are →	the least socially introverted	
	the most socially introverted	→ are the leptoids.

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physique, it will be associated in an inverse degree with the opposite extreme of physique denoted within the limits of one and the same constitutional index or measure.

For descriptive purposes it would be appropriate, although difficult, to select terms that would adequately describe the types of physique denoted by the highest and lowest decile groupings within each constitutional panel. We have proposed the terms "leptoid" and "pyknoid" to be somewhat in keeping with the phraseology used in the first section of this report. The former term denotes the tall physique and the latter describes the short type of bodily build. Since we are dealing with two contrasted types of a single continuum within each constitutional panel, we assume that "leptoid" represents the antithesis of "pyknoid." If an "athletoid" type exists it has yet to be decided whether it is subsumed in either or neither of the leptoid and pyknoid groups.

TABLE 30

CHANCES IN 1000 THAT *x* OR MORE DUPLICATIONS OF *S*'S WHOSE SCORES ARE WITHIN THE HIGHEST 10 PER CENT OF THE TOTAL DISTRIBUTION OF PERSONALITY SCORES AND THE HIGHEST AND LOWEST 10 PER CENT OF THE TOTAL DISTRIBUTION OF CONSTITUTIONAL INDICES P_1-P_5 WOULD ARISE BY CHANCE

Personality variables	Cyclothymic trends	Schizothymic trends	Ascendance	Emotional sensitiveness to environment	Social introversion	Extraversion	Intellectual leadership	Social leadership	Introversion (Bernreuter)
P_1 *A* 10% *H*	632	300	567	883	883	168	632	567	300
Z 10% *L*	632	1000	567	883	300	687	632	567	602
P_2 *A* 10% *H*	36	300	567	883	1000	392	896	267	883
Z 10% *L*	1000	602	567	602	1	1000	896	1000	602
P_3 *A* 10% *H*	1000	300	267	602	1	1000	896	868	602
Z 10% *L*	10	632	881	331	1000	427	363	597	896
P_4 *A* 10% *H*	1000	602	567	300	1	1000	1000	868	602
Z 10% *L*	36	602	868	300	1000	687	632	91	883
P_5 *A* 10% *H*	1000	896	597	632	36	1000	909	1000	632
Z 10% *L*	45	127	597	331	1000	427	662	597	1000

B

TABLE 10 (*continued*)

Personality variables	Personal adjustment	Social adjustment	Self control	Creativeness and imagination	Influence	Responsibility	Cooperativeness	Socio-economic status	IQ	Talkativeness
P_1 *A* 10% *H*	632	1000	760	100	1000	803	10	331	739	192
Z 10% *L*	896	384	760	707	870	118	664	896	937	929
P_2 *A* 10% *H*	632	760	384	707	272	289	45	896	937	192
Z 10% *L*	896	384	384	707	1000	958	1000	1000	937	1000
P_3 *A* 10% *H*	896	384	384	707	1000	958	909	1000	937	1000
Z 10% *L*	909	778	410	735	300	326	172	662	766	80
P_4 *A* 10% *H*	632	760	760	1000	1000	1000	664	896	457	1000
Z 10% *L*	1000	760	29	926	23	118	45	632	739	716
P_5 *A* 10% *H*	909	410	410	735	1000	968	1000	1000	1000	1000
Z 10% *L*	909	778	410	735	109	142	14	662	946	463

TABLE 11

CHANCES IN 1000 THAT *x* OR MORE DUPLICATIONS OF *S*'S WHOSE SCORES ARE WITHIN THE LOWEST 10 PER CENT OF THE TOTAL DISTRIBUTION OF PERSONALITY SCORES AND THE HIGHEST AND LOWEST 10 PER CENT OF THE TOTAL DISTRIBUTION OF CONSTITUTIONAL INDICES P_1-P_5 WOULD ARISE BY CHANCE

Personality variables	Cyclothymic trends	Schizothymic trends	Ascendance	Emotional sensitiveness to environment	Social introversion	Extraversion	Intellectual leadership	Social leadership	Introversion (Bernreuter)
P_1 *A* 10% *H*	186	1000	896	868	192	896	1000	868	919
Z 10% *L* 10%	1000	469	331	868	716	127	243	567	54

TABLE 31 (*continued*)

P_2 A H 10%	814	469	1000	267	426	1000	853	868	54
Z L 10%	51	469	127	567	929	8	540	567	687
P_3 A H 10%	51	469	127	567	929	8	540	567	687
Z L 10%	831	498	1000	107	463	1000	868	1000	193
P_4 A H 10%	51	814	36	868	1000	8	243	267	919
Z L 10%	814	469	1000	567	714	1000	583	567	687
P_5 A H 10%	61	498	148	881	939	2	270	597	1000
Z L 10%	831	208	1000	296	463	1000	1000	881	66

Personality variables	Personal adjustment	Social adjustment	Self control	Creativeness and imagination	Influence	Responsibility	Competitiveness	Socio-economic status	IQ	Talkativeness
P_1 A H 10%	392	786	4	1000	1000	1000	365	883	853	1000
Z L 10%	1000	1000	1000	49	926	767	365	883	243	469
P_2 A H 10%	1000	1000	868	916	707	1000	909	883	853	814
Z L 10%	168	786	868	49	182	132	664	883	540	1000
P_3 A H 10%	392	422	868	49	182	132	664	1000	853	814
Z L 10%	1000	803	881	927	735	1000	921	632	868	831
P_4 A H 10%	392	38	91	916	707	1000	365	883	1000	814
Z L 10%	392	422	1000	679	414	767	1000	883	540	469
P_5 A H 10%	427	1000	881	15	73	149	693	632	570	498
Z L	929	803	1000	708	450	1000	921	632	570	498

Y

DISCUSSION OF RESULTS

P_1

In relation to height it will be seen from the use of the $\frac{Diff.}{\sigma_{diff.}}$ method that the most significant relationships concern the patterns of social leadership, attitude towards war, schizothymic trends, influence upon one's contemporaries, competitiveness, self-control, and intelligence. In no one of these instances, however, is the difference sufficiently significant to be regarded as certain.

According to our results the male adolescent who is definitely taller than his contemporaries tends also to be more intelligent and competitive and more of a social leader. He tends to be more favorably disposed towards war and is one who exercises a considerable amount of influence. On the contrary the shorter individual tends to be more schizothymic and more self controlled than the taller.

By means of the duplication technique we find that the personality patterns in which there is the greatest number of sortings is that of competitiveness, and habits of self control. The number of duplications among those subjects who were within the highest decile ranking in the patterns of competitiveness and self control and those who were in the tallest tenth of the total population was six. In the case of the former personality pattern this is represented by an *AB P.R.* of 10/1000. Since the *BZ P.R.* is 664/1000, it is evident that with tall stature there is associated a marked degree of competitiveness, the tallest individuals being more competitive than the shortest. Regarding habits of self control six duplications mean an *AY P. R.* of 4/1000. Thus we are tolerably certain to find that with tall stature there is associated relatively little self control. Since the *YZ P. R.* is 1000/1000 it appears that short subjects are more self controlled. In view of both these findings, therefore, we are justified in stating that our tallest subjects are less self controlled than the shorter ones.

If we consider the results of the adoption of both tests for measuring the trait of extraversion we are fairly certain in testifying that there is a definite trend for the tallest subjects to be extraverted. Conversely the shortest tend to be more socially introverted than the tallest. Summarizing our results in relation to height as indicated by P_1 we find that by comparing subjects who represent groups of extremes of personality sources:

1. There is a strong tendency for height to be positively associated with competitiveness, social leadership, extraversion and influence upon one's contemporaries. The tallest subjects are more competitive, more marked social leaders, more extraverted and more influential among their contemporaries than the shortest among the group.

2. The tallest tend to be more favorably disposed toward war, while the shortest are apt to be more intelligent, self controlled, schizothymic, and socially introverted.

P_2

By using the $\frac{Diff.}{\sigma_{diff.}}$ technique, we find there is a marked difference between the contrasted decile groupings of physique in respect of the following personality patterns: cyclothymic trends, ascendance, social introversion, extraversion, social leadership, influence, competitiveness, and talkativeness. There is a less marked difference between the physical groups in respect of personal adjustment and creativeness and imagination. Compared with the lightest group, the heaviest boys are markedly more cyclothymic, extravated, talkative, and competitive. They are recognized as better social leaders and exert a stronger influence upon their contemporaries than the lightest do. There is less marked association of personal adjustment and creativeness and imagination with the heavier group.

By means of the duplication method we see that the above conclusions are generally reinforced. Schema 3 makes this clear.

SCHEMA 3

Personality Pattern	P Rs.			
	AB	*YZ*	*AY*	*BZ*
Cyclothymic pattern	36/1000	51/1000	1000/1000	1000/1000
Extraversion	168/1000	8/1000	1000/1000	1000/1000
Influence	272/1000	182/1000	707/1000	1000/1000
Responsibility	289/1000	132/1000	1000/1000	958/1000
Competitiveness	45/1000	664/1000	909/1000	1000/1000
Ascendance	567/1000	127/1000	1000/1000	567/1000

We have some evidence to lead us to disagree with Bellingrath (4), one of whose conclusions was that leadership was not associated with "goodness" of physical build.[73]

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[73] Bellingrath's technique of obtaining his physical data is obviously vulnerable to criticism; he merely asked his subjects to report their weight and height. Leadership was diagnosed by means of a rating scale and with reference to positions held by high school students in extra curricular activities. He found that among boys classified as non-leaders and leaders there were no significant differences in weight or height. With girls it was different, the girls elected to positions of leadership being both heavier and taller than the average girl not elected to leadership.

Summarizing the foregoing results dealing with the relationship between weight and various personality patterns, we find there is a strong tendency for weight to be positively associated with the following: cyclothymic pattern, ascendance, extraversion, social introversion, influence upon one's contemporaries, competitiveness, talkativeness, and social leadership. There is a less marked association of weight and the following: personal adjustment and talkativeness. The results revealed by both statistical methods are strikingly similar, with weight positively associated with the presence of those traits which have an important social significance.

P_3

It is clear that if a subject has a high height-weight ratio he would be more apt to be classified as a leptoid than a pyknoid: his general configuration would resemble that which is characteristic of the leptosome, while a subject with a low ratio would resemble the general physical configuration of the pyknosome. Expressed in terms of Naccarati's system of classification, a high height/weight ratio is indicative of microsplanchny and conversely a low ratio indicates the macrosplanchnics. Stated more simply, those subjects who fall within the highest decile of the measures for P_3 are tall and thin, and those in the lowest decile, short and stocky.

Considering the data arranged according to Procedure *A* and disregarding for the moment the *direction* of correspondence, we find a high degree of association between this ratio and the following personality patterns: cyclothymic trends, social introversion, extraversion, social leadership, intellectual leadership, and influence upon one's contemporaries. There is a fairly high degree of relationship in the case of schizothymic trends.

With the same statistical technique applied to the data arranged according to Procedure *B* we find that a high degree of relationship exists in regard to cyclothymic pattern, social leadership and extraversion, with a less marked degree of association in the case of competitiveness and personal adjustment. Combining these results and expressing the *direction* of the relationship between the personality patterns and the types of physique indicated by the highest and lowest decile groups within the P_3 category we observe that the short stocky subject-macrosplanchnic and pyknoid—tends to be more cyclothymic, extraverted, a better social and intellectual leader and one who exercises more influence on his contemporaries than does the tall subject-microsplanchnic and leptoid. Conversely the latter is more socially introverted, and schizothymic.

TABLE 32

CHANCES IN 100 OF A TRUE DIFFERENCE GREATER THAN ZERO WITH DATA ARRANGED BY PROCEDURE *A* AND PROCEDURE *B*

Personality pattern	Social introversion	Extraversion	Intellectual leadership	Social leadership	Creativeness and imagination	Influence	Cyclothymic pattern	Schizothymic pattern
Procedure *A*	98	98	98	100	94	99	100	96
Procedure *B*	94	100	82	98	93	96	100	67

The duplication method gives us low *AY* and *BZ* *P.R.*'s checked by relatively high *AB* and *YZ* *P.R.*'s in the personality patterns as given in Table 32*a*.

TABLE 32*a*

Personality pattern	*P.R.*'s *AY*	 *BZ*	 *AB*	 *YZ*
Cyclothymic trends	51/1000	10/1000	1000/1000	831/1000
Extraversion	8/1000	427/1000	1000/1000	1000/1000
Creativeness and imagination	49/1000	735/1000	1000/1000	927/1000
Influence	182/1000	300/1000	1000/1000	927/1000
Responsibility	132/1000	326/1000	958/1000	1000/1000

With a high height/weight ratio we find associated to a marked degree the pattern of social introversion for which the probability ratios are as follows:

AB	1/1000	*AY*	929/1000
YZ	463/1000	*BZ*	1000/1000

The original investigations of Naccarati (52) and his general conclusions that with microsplanchny there is associated high intelligence, and with macrosplanchny, dullness, have been tested by other[74] workers. They have generally failed to share the belief that there is a significant relationship between either microsplanchny or macrosplanchny and intelligence. We have found no significant association between intelligence and either of the two contrasted forms of physique. The various probability ratios are as follows:

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[74] Heidbreder (26); Sheldon (64); Garrett and Kellogg (19).

AY	853/1000	*BZ*	766/1000
YZ	868/1000	*AB*	937/1000

Further, when we consider the relationship between physique and intellectual leadership, our evidence revealed by the duplication method tends to confirm the findings shown by the use of the $\frac{diff.}{\sigma_{diff.}}$ method. There is a tendency to associate intellectual leadership with pyknoid physique, a conclusion that is the reverse of Naccarati's although in our instance we are dealing with intellectual leadership and not entirely with intelligence as a variable.

Pallister (57) used the Lecky *Individuality Record* to measure the degree of withdrawal or so called negative attitude among 209 women students in Barnard College whose ages ranged from 16 years 7 months to 22 years 5 months, and by means of the biserial *r* method looked into the degree of relationship between these scores and the height/weight ratio. She found practically no relationship between the two variables. Pallister's further conclusions concerning Kretschmer's classification and the validity of his typology based on her own observation is an instance of the fallacy of any attempt to substitute for a concept appropriate to a particular system of ideas, one derived from another system and then to proceed to demolish the latter on the basis of evidence supplied rather specifically in relation to the former. To quote Pallister:

> Extreme forms of withdrawal attitude are clinically recognized as schizophrenia. Since within the group we studied, the correlation between withdrawal attitude and height/weight ratio is negligible, we are unable to accept Kretschmer's conception as applicable to such a population as we employed (p. 38).

To dismiss Kretschmer's contentions on this basis seems somewhat high handed: it is at any rate a decidedly open question whether the "withdrawal pattern" as diagnosed by one pencil and paper test supplies us with sufficient evidence as a basis for rejecting the possibility of the presence of a much more complex syndrome, which shows more consistency with Kretschmer's delineation of his personality types.

P_1

As in the case of P_3, low values of this measure suggest the pyknoid physique and high values the leptoid constitution. A consideration of the results obtained by comparing the data as arranged according to Procedure *A* shows that significant differences exist between the pyknoid and leptoid groups in respect of the following personality patterns: cyclothymic pattern, extraversion, social introversion, social leadership, self control, and competitiveness. Positive relationships of a fairly high order are found in the case of ascendance, intellectual leadership, and social adjustment.

Considering the data when arranged according to Procedure *B*, we find that significant differences exist where the personality variables are cyclothymic pattern and extraversion. Positive relationships of a fairly high order exist in the case of ascendance, social introversion, social leadership, competitiveness, and intelligence.

TABLE 33

CHANCES IN 100 OF A TRUE DIFFERENCE GREATER THAN ZERO WITH DATA ARRANGED BY PROCEDURE *A* AND PROCEDURE *B*

Personality variable	Cyclothymic pattern	Extraversion	Social introversion	Social leadership	Self control	Competitiveness	Intelligence	Intellectual leadership	Self control	Social adjustment	Ascendance
Procedure *A*	100	100	100	99	99	99	92	97	99	98	98
Procedure *B*	100	100	99	99	100	97	98	85	100	83	96

Since the direction of the relationships is just as important as the knowledge that positive relationships exist between physique and personality our results in this particular section indicate that a subject of pyknoid physique is one who is extraverted and cyclothymic, self controlled, competitive, ascendant, and a better social and intellectual leader than a subject with a leptoid physique. The latter, however, tends to be definitely more socially introverted.

By means of the duplication formula we have evidence to reinforce some of the foregoing conclusions, as shown in Table 33*a*.

TABLE 33*a*

	P.R.'s			
Personality pattern	*AY*	*BZ*	*AB*	*YZ*
Cyclothymic trends	51/1000	36/1000	1000/1000	814/1000
Extraversion	8/1000	687/1000	1000/1000	1000/1000
Social leadership	267/1000	91/1000	868/1000	567/1000
Self control	91/1000	29/1000	760/1000	1000/1000
Competitiveness	365/1000	45/1000	664/1000	1000/1000

Regarding introversion measured by the Bernreuter Personality Inventory and social introversion, we have somewhat similar results, namely, an association of these patterns with the leptoid physique. The *P.R.*'s are as follows:

	AB	*YZ*	*BZ*	*AY*
Introversion (Bernreuter)	602/1000	687/1000	883/1000	919/1000
Social introversion	1/1000	716/1000	1000/1000	1000/1000

In the case of social introversion, there is rather conclusive evidence to indicate that this pattern is associated with the leptoid physique and not with the pyknoid type of body-build. In general, therefore, there is sufficient evidence to show that contrasted with leptoids, pyknoids as defined in terms of this index, are more cyclothymic, extraverted and self-controlled. They appear to be definitely more successful as social leaders and more ascendant although somewhat less markedly so than the leptoids.

P_5

A consideration of the data arranged according to Procedure *A* shows that a definite degree of positive relationship exists between physique as measured by this index and the following personality patterns: cyclothymic trends, social introversion, extraversion, social leadership, introversion as measured by the Bernreuter Personality Inventory, creativeness and imagination, and influence upon one's contemporaries. A fairly high relationship but insufficient to be regarded as certain occurs in the case of ascendance, responsibility, competitiveness, and intelligence.

TABLE 34
CHANCES IN 100 OF A TRUE DIFFERENCE GREATER THAN ZERO WITH DATA ARRANGED BY PROCEDURE *A* AND PROCEDURE *B*

Personality variable	Cyclothymic pattern	Social introversion	Extraversion	Social leadership	Introversion (Bernreuter)	Creativeness and imagination	Influence	Ascendance	Responsibility	Competitiveness	Intelligence	Intellectual leadership
Procedure *A*	100	100	100	100	100	100	100	99	96	99	96	93
Procedure *B*	100	100	100	100	99	93	98	97	94	100	67	98

When the data is arranged according to Procedure *B*, we find with the application of the $\frac{diff.}{\sigma_{diff.}}$ method that significant differences exist between the two contrasted constitutional groups in relation to the following personality patterns: cyclothymic trends, extraversion, social leadership, and competitiveness. A fairly significant difference exists in regard to the following: introversion, influence upon one's contemporaries, ascendance, responsibility, and intellectual leadership.

By the application of the duplication formula we have the probability ratios for various personality patterns as shown in Table 34*a*.

TABLE 34*a*

	P.R.'s			
Personality pattern	*AY*	*BZ*	*AB*	*YZ*
Cyclothymic trends	61/1000	45/1000	1000/1000	831/1000
Extraversion	2/1000	427/1000	1000/1000	831/1000
Creativeness and imagination	15/1000	735/1000	735/1000	708/1000
Influence	73/1000	109/1000	1000/1000	450/1000
Competitiveness	632/1000	14/1000	1000/1000	921/1000
Social leadership	597/1000	597/1000	1000/1000	881/1000
Intellectual leadership	270/1000	662/1000	909/1000	1000/1000

The *P.R.'s* for the patterns of introversion as measured by the Bernreuter Inventory and social introversion are as follows:

	AB	*YZ*	*AY*	*BZ*
Introversion (Bernreuter)	632/1000	66/1000	1000/1000	1000/1000
Social introversion	36/1000	463/1000	939/1000	1000/1000

Summarizing the foregoing results and observing the direction of the relationship between physique and the personality patterns, we can say that the pyknoid type of boy as defined in terms of this index is one who is more cyclothymic, extraverted, creative and imaginative, influential, competitive, ascendant, responsible, and more of a social and intellectual leader than his leptoid neighbor. However, the latter tends to be markedly more socially introverted than the pyknoid. Here we have an almost point to point reinforcement of the conclusions derived from a study of the investigation of the relationship between physique as measured by P_5 and the same personality variables as were considered under the panel of P_4. Whether we consider the relationship by referring from physique to personality scores or from personality scores to physique, we obtain a decided trend in the direction of close association in certain cases. The relationship particularly affects those personality characteristics that have a high social value. They are also those qualities which have an important survival value for the individual in his social relationships.

It is not until we consider groups separated on the basis of P_4 and P_6 that we are justified in drawing conclusions related to Kretschmer's theory. This is partly because these two indices have been empirically found useful in differentiating Kretschmer's constitutional types, and partly because in our own results we see that differences are more accentuated and the correlating personality variables increased in number. Whatever the type of constitutional measure, we obtain the same meaningful results from the point of view of the theory of constitutional advantage. The more detailed and more representative the index is of constitutional build the sharper the distinctions the personality-variables having socio-sthenic significance seem to possess.

By reason of our method of dividing our groups on a constitutional basis carried out in accordance with the desire to deal only with extremes, we have, at this stage, no means of telling whether in the pyknoid physique there would also be included the athletoid physique. Hence it is difficult to estimate precisely how much of our evidence in this section we are entitled to appropriate to support the theory of biological or constitutional advantage. That at least some can be so adduced is beyond question because of our results obtained when comparing the three constitutional groups in respect of the same personality patterns. The results obtained in this and the foregoing section indicate a kind of correlative and therefore consistent superiority between one kind of physique and personality traits that form a fairly homogeneous pattern. The results tend to confirm the findings of Terman (66) concerning the general high grade development in the matter of personality traits, athletic ability, intelligence, interests and physique, although our own problem was limited to the narrow field of personality and physique and our subjects were only a sample of average high school male adolescents. Our conclusions are also similar to the viewpoint of Hollingworth (27) who, in discussing individual differences concerning the limits of possible training in learning types of performance, refers to the general correlation between traits. He believes it is possible to measure the degree of correlation between "desirable traits" which may be characteristic enough to warrant the adoption of some such general concept as "the quality of the organism." In our particular case we may regard the "good" physique of the athletosomes or the correlative consistency of socially valuable personality characteristics as a similar index of the "quality of the organism."

AN INDEX STUDY OF "ATHLETOIDS"

We have already seen in III that where pyknosomes, leptosomes and athletosomes were differentially diagnosed on the basis of subjective estimate, athletosomes possessing what has been termed "good" physique were markedly superior in personality variables of high social significance. But thus far we have not been able to make the same triple comparison with objective constitutional measures, that is, to consider the personality characteristics of the athletoids and to compare them with those of the leptoids and pyknoids. What are the physical characteristics of the athletoid? Since our terms "leptoid" and "pyknoid" refer only to that type of constitutional build indicated by the subjects who fall within the highest and lowest tenth of the rank order distribution of values for any one constitutional measure, we can understand by the term "athletoid" that type of physique indicated by the subjects whose index values fall within the approximate middle 10 per cent of the same distribution of index values. Thus the three terms merely describe those subjects whose index values are within certain arbitrarily determined groups. There is a certain degree of similarity between the general physical pattern of the leptoid and the pykonoid and with the leptosomic and pyknosomic types of constitutional build. Just as we are able to distinguish leptosomes, athletosomes and pyknosomes, we assume it is possible likewise to distinguish the leptoids and pyknoids whose arbitrary selection depends upon the rank order of their corresponding index values. A specific question may be raised regarding the relationship between subjects selected on the basis of subjective criteria on the one hand and by objective data on the other. Let us examine each pair remembering that the terms "pyknoid" and "leptoid" were adopted to describe generally those subjects who fall at the extremes of the distribution of constitutional values.

Pyknosomes-pyknoids

In the case of P_8 —the index finally selected within which are our experimental group of athletoids—we find that among the pyknoids there are four pyknosomes or 44 per cent of the total number of pyknosomes.

Leptosomes-leptoids

Within P_5 we find that among the leptoids there are ten leptosomes or 36 per cent of the total number of leptosomes.

Athletosomes-athletoids

Using the same index for our comparisons we see that among the athletoids there are seven athletosomes or 28 per cent of the total number of athletosomes.

That there is not a greater overlap of subjects subjectively diagnosed and those separated on the basis of objective criteria, may be due to at least the two following reasons:

1. The interviewer's and teachers' impressions were not mathematically determined.
2. This constitutional index may not be suitable for differentiating pyknosomes, leptosomes and athletosomes when the subjects are normal male adolescents.

It is important therefore to discover empirically that index within which the third constitutional group—athletoids—can be found without any overlap with the pyknoids or leptoids. Before making the final selection of the desired index it is necessary to find the two indices which correlate most highly with one another.

It is conceivable that while P_1 (height) correlates positively with

TABLE 35

INTERCORRELATIONS OF VALUES OF INDICES P_1–P_5[11]

	P_2	P_3	P_4	P_5
P_1	.25 ±.051	—.05 ±.047	—.13 ±.046	—.11 ±.046
P_2		—.65 ±.032	—.47 ±.044	—.60 ±.033
P_3			.63 ±.028	.89 ±.013
P_4				.69 ±.025

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[11] $r = \frac{xy}{N\sigma x\sigma y}$.

P_2 (weight) the former can also correlate negatively with P_3 (height/weight ratio); likewise one could expect a negative correlation between P_1 and either P_1 or P_5. Since P_1, P_5, and P_3 overlap, a positive correlation between all three indices would be expected. Further a closer correlation should exist between P_3 and P_5 since the latter embodies the height/weight ratio. With $r_{35} = .89$ we still have to make a final choice between P_3 and P_5.[76] The latter was selected for the following reasons: (1) It agrees best with the other constitutional ratios, P_3 and P_4; (2) there is more evidence to support the contention that P_5 is more valid than P_3 for the separation of at least two of Kretschmer's constitutional types—pyknosomes and leptosomes.[77]

The next step in the discovery of an athletoid group consisted in checking in the distribution of P_5 values those which indicated the subjects who had been previously classified as athletosomes. In addition other values were checked on the basis of a further examination of the interviewer's data referring to the physical characteristics of the subjects. A segment of the total distribution was then arbitrarily selected on the basis of the foregoing evidence which included approximately 10 per cent of the total population and which was grouped as near the median as possible. Our new experimental group of athletoids now consisted of 20 subjects whose range of P_5 index values was 508-523.[78] We have seen that where the constitutional types were selected entirely on the basis of subjective estimate the athletosomes were superior to both pyknosomes and leptosomes in respect to those personality patterns of high social value, such as ascendance, responsibility, cyclothymic pattern, extraversion, and influence upon contemporaries. These behavior patterns were associated with "good" physique. Further, we have also seen striking parallel differences between the pyknoid and leptoid groups regarded as extremes of physique denoted by five separate indices. These results were confined by a consideration of the physique of subjects who also represented extremes of development of certain personality characteristics.

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[76] Since P_3, P_4 and P_5 are all positively correlated with one another, we might have been justified in making a final selection between any two of these. The difference between the r_{34} and r_{45} or between r_{35} and r_{45} might not be significantly important to warrant a decision between P_3 and P_5, but since we actually have a higher r in this comparison we have some evidence to support our choice.

[77] Klineberg, Asch and Block. *Op. cit.*, pp. 170-172. This index is recommended by these investigators; their subjects were normal individuals whose average age levels was somewhat similar to that of our own subjects. The usefulness of the P_5 index in this direction has been indicated by Wertheimer and Hesketh (74), but their subjects were psychopathic adults. Even with similar material Wigert (76) did not find the Wertheimer Hesketh index as satisfactory as did its authors.

[78] Range for total distribution ($N = 188$): 318-699. $M = 531$ ($\sigma = 62.55$).

For purposes of comparison we have chosen those personality variables in which the athletosomes had evinced marked superiority over the pyknosomes and leptosomes; that is to say those variables already found to be associated with the "good" physique.[79] From Table 36 it will be seen that fairly significant differences exist between the performances of the leptoids and the athletoids in the case of the following personality patterns: ascendance, influence upon the contemporaries, social leadership, cyclothymic trends, and extraversion. The athletoids are superior to the leptoids in the case of these personality variables. Only in the case of competitiveness do we find the superiority of the athletoids over the leptoids not particularly significant.

It will be seen that pyknoids are significantly superior to the leptoids in all the variables except "intellectual leadership." In addition, pyknoids are superior to the athletoids, although only in the case of "intellectual leadership" may the difference be considered significant. When we compare the personality characteristics of our three constitutional groups, divided on the basis of index values, we thus find that the direction of the association between personality characteristics and physique has remained the same as that discovered when we compared pyknosomes, athletosomes, and leptosomes.

Yet it is incontrovertible that neither the leptosomes with their personality characteristics can be confused with pyknosomes and the athletosomes, nor can the leptoids with their characteristic personality patterns be assimilated with either the athletoids or pyknoids. In this sense therefore we fail to confirm Kretschmer's belief that individuals who are athletosomic or leptosomic in physique should be classified as one group in regard to their personality patterns.[80] We agree with Mohr and Gundlach (49) who did not feel that athletosomes should be classified with leptosomes within a single category; we also support Willemse (77) who, after reviewing the

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[79] See III.

[80] Cf. Kretschmer (37), pp. 208, 209; 34, 35 (36), pp. 148, 149.

TABLE 56

CHANCES IN 100 OF A TRUE DIFFERENCE GREATER THAN ZERO WITH PYKNOIDS, ATHLETOIDS AND LEPTOIDS AS SUBJECTS

Personality variable	Constitutional type	N	M	σ_m	Comparison of	$\frac{Diff.}{\sigma_{diff.}}$	Chances in 100 of a true difference greater than zero	Interpretation
Competitiveness	Pd.	20	2.6	.15	Pd and Ld	2.2870	99	Pd is higher
	Ad.	19	2.9	.21	Pd and Ad	1.1623	87	Pd is higher
	Ld.	20	3.0	.09	Ad and Ld	.4376	65	Ad is higher
Social leadership	Pd.	20	3.4	.17	Pd and Ld	3.2710	100	Pd is higher
	Ad.	20	3.5	.17	Pd and Ad	.4160	65	Pd is higher
	Ld.	20	4.1	.13	Ad and Ld	2.8057	99.74	Ad is higher
Influence	Pd.	19	3.2	.19	Pd and Ld	3.0440	100	Pd is higher
	Ad.	19	3.5	.21	Pd and Ad	1.0593	85	Pd is higher
	Ld.	20	4.0	.15	Ad and Ld	1.9372	97	Ad is higher
Ascendance	Pd.	20	4.2	2.75	Pd and Ld	2.2619	98.6	Pd is higher
	Ad.	20	4.4	4.74	Pd and Ad	.0365	50	Ad is higher
	Ld.	20	—7.2	4.25	Ad and Ld	1.8259	96	Ad is higher
Cyclothymic trends	Pd.	20	2.9	.14	Pd and Ld	3.3708	100	Pd is higher
	Ad.	20	3.2	.09	Pd and Ad	1.8029	96	Pd is higher
	Ld.	20	3.5	.11	Ad and Ld	2.1112	98	Ad is higher
Extraversion	Pd.	20	1.9	.09	Pd and Ld	3.1422	100	Pd is higher
	Ad.	20	2.0	.10	Pd and Ad	.7435	76	Pd is higher
	Ld.	20	2.3	.09	Ad and Ld	2.2304	99	Ad is higher
Intellectual leadership	Pd.	20	3.5	.12	Pd and Ld	1.5617	93	Pd is higher
	Ad.	20	3.9	.15	Pd and Ad	2.0822	98	Pd is higher
	Ld.	20	3.8	.15	Ad and Ld	.4715	67	Ld is higher

evidence afforded by the results of observations in the experimental and psychopathological fields, concludes from a study of crimes committed by juvenile delinquents that without doubt leptosomes should not be classified with athletosomes.

VI. REVIEW AND INTERPRETATIONS

The Kretschmerian claim that the manic-depressive and the schizophrenic psychoses are associated with the pyknosomic and leptosomic types of bodily build respectively has been elsewhere generally verified. However, there has been less experimental verification of the corresponding claims that the more normal cyclothymic and schizothymic personality patterns are associated with the respective pyknosomic and leptosomic constitutional types. Investigations, both European and American, have been conducted in an attempt to associate with the characteristic constitutional types—pyknosomes, leptosomes and athletosomes—many mental, sensori-motor, and physiological functions. In the majority of cases, the subjects studied have been patients in psychiatric clinics or special institutions. A few investigators have claimed it is possible not only to distinguish pyknosomes, leptosomes and athletosomes as far down the age scale as infancy, but also to discover various characteristic and differential qualities of personality in agreement with the Kretschmerian correlations. Kretschmer himself makes no commitments in this direction. In general, European studies of an experimental nature that have been concerned with typological correlations between physique and personality have overlooked the necessity for observing the requirements of statistical and scientific methodology.

Our problem had two aspects; the first concerned the validity of Kretschmer's claims regarding the close association of the general type of personality known as schizothymic, and that known as cyclothymic, with the leptosomic, athletosomic and pyknosomic habitus respectively; the second concerned generally the degree of association between extremes of bodily build and certain aspects of personality. The subjects were a cross-section of a normal male adolescent group of students, most of whom were in the graduating classes of three high schools and whose average age was 17 years 8 months. Our constitutional types, subjectively determined as pyknosomes, leptosomes, and athletosomes were selected with as much care as possible; only those subjects were accepted concerning the classification of whom there was considerable agreement among several judges. The numbers of clean cut pyknosomes, leptosomes, and athletosomes were 9, 28 and 25 respectively. The physical types objectively determined by the use of constitutional indices were called pyknoids, leptoids, and athletoids. The personality variables were chosen on the basis of a presumed association with physique, or because previous workers in this field had made certain claims about the correlation of those variables and the constitutional types already indicated. Rather than depend upon one source for our personality data we obtained it from several of the subject's teachers by means of rating-scales; from the subject himself with the aid of many tests and a self rating scale, and by means of a special interview technique in a personal conference between the subject and interviewer.

On the whole there was little specific evidence to support Kretschmer. The most telling argument against his theory is the fact that we have found no instance where pyknosomes and leptosomes are significantly different in the traits investigated. This finding is particularly important in the case of cyclothymic and schizothymic patterns, for it is upon these patterns that Kretschmer's theory, so far as it applies to the normal range of personality, is primarily based. However, we have discovered a remarkable degree of association between the athletosomic bodily build and certain personality traits that, as a constellation, have high social value. The athletosomic physique is one that is most desirable from the viewpoint of social approval, physiological functioning, freedom of movement, resistance to stress and strain, aesthetics and general constitutional well-being. Thus, considered as having a biologically and socially "good" physique, the athletosome, in relation to the average leptosome is more ascendant, extraverted, responsible, influential, and a better social leader. This is not what is expected in terms of Kretschmer's theory. Compared with the pyknosome, the athletosome is more ascendant, creative and imaginative, and less socially introverted.

Here we have indisputable evidence that the interaction of "good" physique and the social requirements of life result in the development of personality traits that possess superior social value. These results lead us to postulate a new theory of *socio-biological advantage* in terms of which *socio-sthenic* traits and personality characteristics are associated with biologically "good" physique. This particular association between physique and personality is not part of the Kretschmerian theory. The latter, in addition to being nativistically biased, has been primarily based upon psychiatric observations. Our results prove that Kretschmer errs in considering athletosomes with leptosomes as sharing one essential type of personality and then contrasting this amalgam with pyknosomes.

The second section of this report dealt with extremes of physique as before determined by certain constitutional indices. Comparisons were made between the personality characteristics of subjects who represented extremes of physique within the distribution of values of each constitutional index. In addition, the objectively determined physique of those subjects who represented extremes of development in the selected personality variables was also considered. Here, as in the first section there was manifestly strong evidence in behalf of the theory of *socio-biological advantage*. When we compared the personality scores of the subjects whose physique was extreme in development, we obtained unmistakable differences in favor of the "pyknoid" physique with respect to the personality variables of cyclothymic pattern, ascendance, extraversion, intellectual and social leadership, creativeness and imagination, influence among one's contemporaries, and competitiveness. When the physique of the subjects who were objectively determined as representing the extremes of development in certain personality characteristics, was considered, the foregoing conclusions were reinforced.

Comparisons were then made between the personality characteristics of the three groups of subjects represented as pyknoids, leptoids, and a "middle group" called "athletoids," all objectively determined by one constitutional index. Here we found significant differences between the athletoids and leptoids on the one hand, and between pyknoids and leptoids on the other in accordance with our theory of *socio-biological advantage*. But the athletoids showed no such superiority over the pyknoids. In some instances the pyknoids were actually superior to the athletoids, but these differences were not significant. It would appear that the concept of "good" physique postulated by the athletoid habitus must therefore also cover the pyknoid type of bodily-build. That is to say, the athletoids and pyknoids belong as a group distinct from the leptoids with reference to the socially important traits investigated in our study.

As our results indicate, there is only a fair degree of correspondence between the personality characteristics of pyknoids and pyknosomes. For instance, pyknoids differ more markedly from leptoids than pyknosomes do from leptosomes. This is true in the case of social leadership, competitiveness, influence, ascendance, cyclothymic trends and extraversion. Pyknoids and athletoids do not show the marked difference that we have found to exist between pyknosomes and athletosomes. Further, leptoids and athletoids show approximately the same differences as we found between leptosomes and athletosomes. It would seem that the selection of subjects on the basis of objective criteria has emphasized the distinction between pyknoids and leptoids to a degree greater than was possible when pyknosomes and leptosomes were compared. Thus it might appear at first sight that Kretschmer's theory is more justified when we compare pyknoids and leptoids; when we compare pyknosomes and leptosomes we have evidence to refute Kretschmer. However since our own theory of socio-biological advantage covers the facts revealed by a consideration of the personality characteristics of groups of subjects separated on the basis of both subjective and objective criteria, it is thus more adequate than Kretschmer's own theory. It is evident that the emphasis placed by Kretschmer upon the differences between the schizothymic and cyclothymic temperaments is one that has overlooked those sthenic reactions bearing the stamp of social recognition and approval which we have found to be associated with the athletosomic and the pyknoid physique.

At this point it is pertinent to refer to the observations of Willemse who found that delinquents and criminals with well defined athletosomic physique also possessed to a marked degree, traits of self expression that eventually led to acts which were characterized by a sense of superiority, leadership, aggressiveness, and general "hypersocial" qualities. Without necessarily subscribing to this investigator's views concerning the classification of criminals on the basis of Kretschmer's constitutional typology, we agree with the following statement:[81]

> As tensions (and accordingly activity), self-assertion, manliness in males, seem to depend largely on athletic constitutional factors (muscularity, broadness of shoulders, etc.) we are forced to believe that the normal athletic is a valuable social asset.

While we have seen that the athletoid and the pyknoid physique can be reasonably regarded as "good," we are still called upon to express an opinion concerning the relationship between the athletosomic and the pyknoid types of constitutional build, although we know so far, that the "best" type of physique favorable to the superiority of the socio-sthenic personality patterns is that represented by the athletosomic and athletoid-pyknoid constitution. If we analyze the distribution of the pyknosomes, leptosomes and athletosomes among the values of the P_5 index when the latter are arranged in rank order, we find that among the pyknoids are six athletosomes. Since the superiority of the pyknoids over the athletoids in the majority of the personality variables compared, was rather insignificant, it is reasonable to suppose that the physique denoted by the pyknoid group is much more like that indicated by the athletosomes than that expressed by the pyknosomes. Hence if we were called upon to indicate a hierarchy of "good" physique with respect to the superior association with the "socio-sthenic" personality variables indicated above, it would appear that the most desirable would be that possessed by the athletosomes or athletoids or pyknoids; the next in order would be that of the pyknosomes and the least favorable, that of the leptosomes or leptoids.

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[81] *Op. cit.*, p. 156.

In considering our results, it is almost inevitable that we should attempt to evaluate the relative importance of environmental and constitutional influences in determining the association of the "socio-sthenic" traits with the athletosomic physique. However, it is questionable whether we should regard the constitution in which are manifested both morphological and functional characteristics, as being heavily weighted by "genotypic" factors, that is, those characteristics inherent in the germinal composition of the organism; the constitution "in action" at any given moment results from the interaction of both heredity and environment. The genotypic factors operating in any of the pyknosomic, athletosomic, or leptosomic types of physique may define the *possible limits* of morphological growth and the nature and degree of the development of personality characteristics.

While we can effect relatively little change in the nature of the genotype, the possibilities of altering the paratypic factors are almost boundless. Kahn (29) refers to the biological potentialities of the pyknosomes for example, as "pyknophilic" and to those of the leptosome as "leptophilic." Continuing, he states:

> The Pyknic type of body-build, as I see it, is one manifestation of a personality type which from the start is on better terms with the world than the leptosomic. . . . One may venture to say that by virtue of his biological make-up the pyknic sails more easily through life than the leptosomic. . . . It is not the

> environment essentially that *moulds* the pyknic and leptosomic; rather it is the constitutionally *different* ways of their meeting the world and themselves which *make* them as different as they appear to be (p. 142).

Nowhere does Kahn conceive of "athletophilic" potentialities since he is unwilling to depart from the bi-polar conception of pyknosomic and leptosomic types of bodily-build. It would appear, however, that we are *justified* in assuming the existence of such "athletophilic" potentialities which may or may not be realized according to the nature and strength of the paratypic factors. Thus there is reason to believe that in the case of the observations on athletosomic criminals by Willemse, a different set of paratypic factors might have produced the same sthenic characteristics but in a direction approved by society. Admitting the limitations imposed by genotypic factors, we are of the opinion that for the presence of "socio-sthenic" qualities of personality the athletosome is much more favorably situated in adolescence than either the leptosomes or pyknosomes. Whether the athletosome is likely to preserve these corresponding social characteristics throughout life is another problem, but we may hazard a guess that because of his genotypic endowment he is *more apt* to change his characteristic personality pattern than is either the pyknosome or athletosome. The significance of the term "socio-biological advantage" cannot be overestimated. If the pyknosome may be described as sailing with the wind on the sea of social relationships and the leptosome as sailing against it, the athletosome not only has the power to sail either with the wind or against it, but he can change his tack and steer his course with greater economy of effort and more success than his pyknosomic or leptosomic competitors.

APPENDIX

Leading Conference Questions

1. Would you say you are much more interested in practical everyday problems than you are in abstract and theoretical ones?
2. If someone were to ask you to make a decision about a certain matter, would you generally answer quickly and easily without thinking a long time and very deeply over the matter?
3. Do you think you generally display your feelings and emotions freely and easily?
4. Do you think you are popular and welcome wherever you go and do you therefore have many friends? How many?
5. Do you usually take a very active part in games and sports?
6. In both work and play do you put forth a lot of effort—in other words, play and work intensely and wholeheartedly?
7. Supposing you were in a discussion group, would you try to argue with a more important, or better informed, or older person who happened to be present?
8. Are you ever worried with the thought that you are inferior to anybody?
9. If a teacher were to ask anyone in your class to start a discussion would you volunteer to talk first, provided you had a good idea?
10. If a department store had promised to deliver a pair of football shoes in time for a football game but hadn't done so, would you be determined to tell the store clerk or anyone connected with the store how very dissatisfied you were with the service, or would you let it go?
11. If you should want to enter a room, a park, a movie house, a hall, a museum, or any other place that was guarded by an official, would you argue with him or try to bluff your way past him if you were first denied permission to enter these places?
12. If you met an unknown man, woman, boy or girl whom you have mistaken for a friend, would you feel very embarrassed?
13. Do you take the lead or would you take the lead in expressing general opposition to a person who very much annoys you and others in a group because of his domineering behavior?
14. When you do not agree with what a teacher has said in class do you usually express your opinion there and then?
15. Have you been elected or recognized as president, manager, captain, chairman or the holder of any other position of leadership in more than 6 groups of boys or of boys and girls?
16. Do you read a large number of books, stories, magazines, articles, etc., for pleasure? How many?
17. When two or more boys are together do you usually dominate the conversation?
18. Do you usually start or carry on class-room projects without the help or suggestions of others?
19. Do you usually carry on alone any classroom project that has been suggested or outlined by others?
20. Do you prefer to enjoy entertainments and amusements by yourself?
21. On the whole, would you rather be alone than with friends most of the time?
22. Do you think you are generally quiet and serious-minded?
23. Are you usually inclined to be annoyed or irritated under authority?

24. Do you generally avoid girls, or at least not actively seek their companionship?
25. Are you usually inclined to be very cautious before making a new decision?
26. At the meal table in your own home do you think you talk more than the rest of the family?
27. Do you usually argue or want to argue during most conversations?
28. Do you think you talk very much about your daily experiences (e.g.) the books you read, your doings with other boys, school events, your teachers, football games or other sports, movies, jobs, girls? With whom? When?
29. When you are with other boys or with members of your own family, does your conversation generally flow on easily and readily?
30. Do you generally like to take on responsibilities?
31. Would you call yourself a leader in sports?
32. Would you call yourself a leader in your class organization or in any of the school clubs? Why?
33. When you are with other boys with nothing special to do would you usually suggest a new game or some fresh activity?
34. If you were in a group of boys looking for a person lost in the woods, would you be one of the first to suggest what route to take, what plans to follow and how to organize the party, or would you wish someone else to do this?
35. If you were elected chairman of a meeting today, would you feel confident you could control the meeting firmly and fairly, or would you feel incompetent and out of place?
36. If you were a member of a group of boys that had been asked to make arrangements to entertain a visiting basketball or football team, would you generally be one of the first to express an opinion or would you prefer to wait until several others had expressed their views?
37. If you were in a group of boys about your own age discussing plans for an outing or for a Commencement play or why such and such a boy should not be elected captain of a team, would you persist in trying to convince others of your viewpoint or would you be content to accept the opinions of others without any more fuss after you had stated your views once?
38. Do you think you would do better school work or get better results anywhere else if you knew you were competing with others for some definite prize, honor or other reward?
39. Do you think you get more satisfactory results in school work if you are allowed to work as a member of a group than if you were allowed to work on your own?

Conference Schedule

Rater——————————
Date——————————
School——————————
CYCLTH.
1.—— ——————
2.—— ——————
3.—— ——————
4.—— ——————
5.—— ——————
6.—— ——————
G.

Name of student——————
Date of birth——————
Grade——————

ASCND.
7.—— ——————
8.—— ——————
9.—— ——————
10.—— ——————
11.—— ——————
12.—— ——————
13.—— ——————
14.—— ——————
15.—— ——————
16.—— ——————
17.—— ——————
G.

LDRSP. I.
18.—— ——————
19.—— ——————
G.

SCHZTH.
20.—— ——————
21.—— ——————
22.—— ——————
23.—— ——————
24.—— ——————
25.—— ——————
G.

TLKYS.
26.—— ——————
27.—— ——————
28.—— ——————
29.—— ——————
G.

LDRSP. SOC.
30.—— ——————
31.—— ——————
32.—— ——————
33.—— ——————
34.—— ——————
35.—— ——————
36.—— ——————
37.—— ——————
G.

SYNT.——————
D——————
IDIO.——————

CMTPS.
38.—— ——————
39.—— ——————
G.

PHYSL.
A.______________B.______________C.______________D.______________

Activities outside school hours:
Week days:
Week ends: (Sat.-Sun.)

Sibs: B. (ages)
S. (ages)

PERSONALITY SKETCH:

Rating Scale A

Name of rater ....Name of student rated ....
Date .... Student's grade ....
School ....

Below you will find some statements which refer to the student you are rating. If he possesses the indicated trait or quality to a *very marked* degree or if the statement is *very true,* write *1* in the space provided by the line on the right hand side of the sheet after the statement; write *2* if the trait or quality is present to a *marked but not complete degree* or if the statement is *generally true;* write *3* if the student possesses the trait or quality only in an *average* degree; write *4* if the student has the trait or quality only in a *slight* degree, or if the statement is *barely* true; write *5* if the trait or quality, according to your judgment, is *completely lacking* in the student rated, or if the statement is *entirely untrue. If, because of lack of knowledge of the student rated or for any other reason, you cannot assign a number as a rating on a trait or quality, place a question mark (?) where the number would normally be.*

Please do not consult anyone in making your judgments.

Rate independently.

Do not study long over any one trait or quality.

In reading the statements substitute for X the name of the student rated.

THANK YOU.

1. X is inclined to limit his acquaintances to a select few ______
2. X daydreams frequently ______
3. X likes to read about a thing rather than experience it ______
4. X is frequently absent-minded ______
5. X is inclined to worry over possible misfortunes ______
6. X dislikes to change opinions he has already formed ______
7. X prefers to work things out for himself rather than accept suggestions from others ______
8. X has ups and downs in mood either with or without apparent cause ______
9. X is inclined to be slow and deliberate in movement ______
10. X is inclined to keep quiet when out in company ______
11. X is inclined to think about himself much of the time ______
12. X gets rattled easily in exciting situations ______
13. X is inclined to keep in the background on social occasions ______
14. X's feelings are easily hurt ______
15. X likes to confide in others ______
16. X expresses such emotions as delight, sorrow, anger, etc., readily ______
17. X enjoys getting acquainted with most people ______
18. X prefers to take lead in group activities ______

19. X adapts himself easily in new conditions, i.e., to new environments, situations, places, etc. ______
20. X likes to speak before a large group ______
21. X prefers to work with others rather than alone ______
22. X is high strung and nervous ______
23. X likes competition with his fellows ______
24. X is lively and alert ______
25. X is a markedly free and easy talker ______
26. X tries to evade rules and regulations whenever and wherever possible ______
27. X shows frankness and lack of restraint in the expression of his thoughts, feelings and moods ______
28. X is a leader in organized extra-curricular activities such as
    (a) Sports and athletics ______
    (b) Student body or class organization ______
29. X is aggressive, vigorous and forceful ______
30. X is conscientious ______
31. X is self-reliant ______
32. X becomes discouraged ______
33. X expresses himself better in speech than in writing ______
34. X is inclined to act on the spur of the moment without thinking things over ______
35. X is inclined to study the motives of others ______
36. X likes to persuade others to his point of view ______
37. X likes to sell things ______
38. X works much better when praised ______
39. X is more interested in athletics than in intellectual things ______
40. X likes to have people watch him when he is working ______
41. X feels hurt and depressed when he receives a low mark in school or when he loses a game ______
42. X is bustled and becomes excited when, for some reason or other, the usual routine is upset ______
43. X shows better results in his school work if he is constantly stimulated by the fact that he is competing with others for some prize, honor or award ______
44. X resents suggestions ______
45. X is inclined to be irritated under control ______
46. X displays his feelings very little ______
47. X generally has no difficulty in making conversation with his teacher ______
48. X usually prefers to do his own planning alone rather than seek the advice of others ______
49. X is regarded by his classmates or by his teachers as one whose influence not only shapes but controls the opinions, attitudes and activities of his group ______
50. X is usually a person whose influence, both indirectly and directly, affects the intellectual interests of his classmates ______
51. X is considered by his classmates to be so intellectually superior that they are content to accept his views as carrying considerable authority ______
52. X can be relied upon as a responsible person to initiate or supervise any class-room project. ______

CLASSIFICATION SHEET

Name of rater ....

Date ....

Instructions for Classification

Attached is a list of the names of some of the boys in the Grade in your School. Your cooperation is kindly solicited in a classification of these boys into groups according to the descriptions given below. Please note there is a column provided to indicate those boys whom you may find it difficult to classify in any of the three described groups. If the boy in question seems to you *on the whole* to be more correctly characterized by the descriptions in Group A, please place a check mark opposite his name in Column A. If he seems to you *on the whole* to be more correctly characterized by the descriptions in Group B, then place a check mark opposite his name in column B; if he seems to you *on the whole* to be more correctly characterized by the descriptions in Group C, place a check mark opposite his name in Column C. If the boy does not belong to any of these groups, place a check mark opposite his name in the "D" column

THANK YOU.

	Group A.	Group B.	Group C.
SKULL.	Round. Forehead broad and domed.		
HAIR.		Excessive formation of head hair.	Head hair straight or nearly so. Coarse texture.
FACE.	Broad	Narrow with angular profile. Nose has tendency to be narrow and thin.	Angular profile.
NECK.	Short and full		Strong looking
SHOULDERS.	Rather rounded	Narrow with tendency to stoopness.	Large and broad.
CHEST.		Rather narrow	Strongly formed.
ARMS.	Relatively short.	Long and delicately boned.	Well developed.
HANDS.	Short and wide.		Well developed.
TRUNK	Short and stocky.	Deficiency in thickness.	
LEGS.	Relatively short.	Rather long.	Well proportioned.
GENERAL.	Definite disposition towards plumpness.	Rather thin musculature. Rather slender build. General leanness and relatively tall stature.	Excess fat absent. Well developed musculature. Strongly developed bones.

Name of rater ....

Name	A	B.	C.	D.

CHECK LIST FOR RATERS

Please return this slip with rating scales etc. When assignments are completed, check same in the appropriate spaces in table below.

DIRECTIONS FOR RATING:—

1. *Make your judgments without consulting anyone.*
2. Base your judgments as far as possible upon objective evidence.
3. If you are asked to form a judgment about several students in a group in respect of several traits, qualities or characteristics, rate all the students on one trait, quality or characteristic before passing on to the next trait, etc.
4. In rating any particular trait, quality or characteristic, disregard every trait, etc., except that particular one.
5. Do not study too long over any one student or any one trait, quality or characteristic.

PLEASE SIGN NAME HERE ....

Description of Rating Sheets	Trait Study	Rating Scale A	Classification Sheet
Check Marks			

RATING SCALE B

Name .... Date ....

School .... Grade ....

Below you will find statements which may be completely or partially true or untrue about yourself. Carefully read each statement in turn. If you think the statement is *definitely true*, write the figure *1* in the space provided by the line on the right hand side of the sheet after the statement; write *2* if it is *generally* or *mostly* true; write *3* if it is *sometimes true* and *sometimes untrue;* write *4* if it is *generally untrue* and *5* if it is *definitely untrue.*

Remember:—

1 means that the statement is *definitely true.*
2 means that the statement is *generally true.*
3 means that the statement is *sometimes true and sometimes untrue.*
4 means that the statement is *generally untrue.*
5 means that the statement is *definitely untrue.*

Be sure to answer every question.

1. I like to sell things ______
2. I am inclined to limit my acquaintances to a select few ______
3. I like to read about a thing rather than experience it ______
4. I am inclined to worry over possible misfortunes ______
5. I dislike to change opinions I have already formed ______
6. I prefer to work things out for myself rather than accept suggestions from others ______
7. I am inclined to keep quiet when out in company ______
8. I am inclined to think about myself much of the time ______
9. I get rattled easily in exciting situations ______
10. I am inclined to keep in the background on social occasions ______
11. I like to confide in others ______
12. My feelings are easily hurt ______
13. I enjoy getting acquainted with most people ______
14. I like to take the lead in group activities ______
15. I like to speak before a large group ______
16. I like to have people watching me when I am working ______
17. I prefer to work with others rather than alone ______
18. I like competition ______
19. I adapt myself easily in new conditions, i.e., to new environments, situations, places, etc. ______
20. I have ups and downs in mood either with or without apparent cause ______
21. I am inclined to act on the spur of the moment without thinking things over ______
22. I am inclined to be slow and deliberate in movement ______
23. I express such emotions as delight, sorrow, anger, etc., readily ______
24. I daydream frequently ______
25. I am frequently absentminded ______
26. I express myself better in speech than in writing ______
27. I prefer to take the lead in group activities ______
28. I am inclined to study the motives of others ______
29. I like to persuade others to my point of view ______

30. I work much better when praised ______
31. I am more interested in athletics than in intellectual matters ______
32. I *feel hurt and very much depressed when I receive a low mark in school or when I lose a game* ______
33. I am bustled and become excited when for some reason or other the usual routine is upset ______
34. I feel much happier in my work when I know that I am competing with others for some distinction ______

Copy of Directions for Quantifying in the Appropriate Personality Code Cards the Responses Recorded in R.S.A., R.S.B. and Conference Schedule

1. Add the ratings for each question and record the mean, rounded off to the first decimal place, in the column indicated by the letters Mc.
2. Calculate the difference between this M and each teacher's rating and record it in the appropriate columns, e.g., D_1, D_2, D_3, D_4, D_5. All differences to be regarded as positive.
3. Add these differences, calculate the mean of these differences and record it in *column Mt*.
4. Encircle the Mc figure if the Mt figure[10]
   is 1.3 or greater when there are 5 ratings for one question
   is 1.3 or greater when there are 4 ratings for one question
   is 1.2 or greater when there are 3 ratings for one question
5. Calculate the mean of all the figures in column Mc which are *not* encircled and record it in the square to the right of MM. In the square to the left of MM record the number of ratings in column Mc which are not encircled. If there is no blank square to the left of MM then place this last designated number in the square immediately to the right of MM and shift to the adjoining square on the right, the mean of all the unencircled Mc figures. This procedure applies in the case of the symbols MMcI, "mutatis mutandis."
6. In cases where an interviewer's rating (indicated by column headed I) has to be considered, proceed as above to the point of calculating the mean of all figures in column Mc which are not encircled. Then record this mean in the lowest square of the Mc column. Finally calculate the mean of this figure and the rating in the I column and record the result in the second square to the right of the symbols MMcI.
7. In calculating the MM figure and the MMcI figure, always round off to the first decimal place.
8. Teachers' ratings and a self rating of *zero* do not have any differential significance in the above computations.[11]

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[10] The limits of rejection of this Mc figure are determined by calculating the rounded off mean of the sums of the deviations from the mean of all possible combinations of the scale values 1-5 for three, four and five raters respectively. Therefore any Mc figure above these limits of 1.3, 1.3, 1.2 was rejected. When only two ratings or one rating were available they were arbitrarily rejected as the pooled judgments from two judges were considered reasonably unreliable, except when the two ratings coincided in value. See Direction No. 10.

[11] Because zeros had no value in the rating scale 1-5, an average rating was 3.

9. Neglect altogether only one teacher's rating on any statement.[84]
10. Neglect two teachers' ratings in the computation of MMc except where they both agree in value.

KEY TO LETTER SYMBOLS DESIGNATING PERSONALITY VARIABLES IN SUPPLEMENTARY TABLES

LETTER SYMBOL	PERSONALITY VARIABLES
Y	Cyclothymic pattern
Z	Schizothymic pattern
A-S	Ascendance
A	Emotional sensitiveness to environment
B	Social introversion
K	Extraversion
Li	Intellectual leadership
Ls	Social leadership
B-I	Introversion (Bernreuter)
T W	Attitude toward war
T S	Attitude toward Constitution of U. S. A.
T C	Attitude toward church
M P	Personal adjustment
M S	Social adjustment
M C	Self control
C	Creativeness and imagination
I	Influence
R	Responsibility
C_o	Competitiveness
S-E-S	Socio-economic status
I-Q	Intelligence
T	Talkativeness

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[84] Where only one teacher rated a subject in respect of a trait that rating was rejected.

TABLE 37

Ns, Means, σ_ms, $\frac{Diff.}{\sigma_{diff.}}$s of Personality-Variable Scores Made by Ss within Approximately Highest and Lowest 10 per cent of Serial Distribution of P_1 Values

	Personality variables	Y	Z	A-S	A	B	K	Li	Ls	B-I	T-W	TS
10% H	N	19	[illegible]	19	19	19	19	15	19	19	19	19
	M	3.3	3.2	[illegible]	[illegible]	[illegible]	[illegible]	3.4	3.4	−38.2	[illegible]	6.2
	σ_m	[illegible]	[illegible]	3.82	[illegible]	.18	[illegible]	[illegible]	.17	[illegible]	.21	.26
10% L	N	19	[illegible]	19	19	[illegible]	19	19	19	19	19	19
	M	[illegible]	[illegible]	[illegible]	[illegible]	2.9	[illegible]	3.7	[illegible]	−38.1	3.6	6.4
	σ_m	.12	.15	[illegible]	[illegible]	[illegible]	[illegible]	.17	.21	13.51	.35	.23
	$\frac{Diff.}{\sigma_{diff.}}$	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	1.2126	[illegible]	[illegible]	2.6194	.5762

	Personality variables	[illegible]	M-P	M-S	M-C	C	I	R	Cp	S-F-S	IQ	T
10% H	N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	16	18	19	19	[illegible]
	M	[illegible]	[illegible]	[illegible]	34.3	3.2	3.3	[illegible]	[illegible]	41.7	[illegible]	2.9
	σ_m	.33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.14	[illegible]	[illegible]	[illegible]	.16
10% L	N	[illegible]	[illegible]	19	19	14	[illegible]	17	16	19	18	19
	M	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.7	[illegible]	2.9	[illegible]	[illegible]	3.1
	σ_m	.22	[illegible]	.62	.52	.26	[illegible]	.15	.13	2.35	2.27	.16
	$\frac{Diff.}{\sigma_{diff.}}$	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.5319	[illegible]	1.9967	.8838

TABLE 38

NS, MEANS, σ_mS, $\frac{Diff.}{\sigma_{diff.}}$S OF PERSONALITY-VARIABLE SCORES MADE BY S'S WITHIN APPROXIMATELY HIGHEST AND LOWEST 10 PER CENT OF SERIAL DISTRIBUTION OF P_2 VALUES

	Personality variables	Y	Z	A-S	A	B	K	Li	Ls	B-I	T-W	T S
10%$_H$	N	19	19	19	19	19	19	19	19	19	19	19
	M	2.8	3.4	4.0	3.2	3.1	1.9	3.5	3.3	—61.7	4.1	6.7
	σ_m	.14	.12	2.81	.06	.10	.10	.15	.17	9.88	.30	.27
10%$_L$	N	19	19	19	19	19	19	19	19	19	19	19
	M	3.4	3.3	—7.5	3.1	2.7	2.3	3.8	4.1	—39.3	4.0	6.8
	σ_m	.14	.13	3.79	.06	.10	.10	.13	.13	10.41	.19	.23
	$\frac{Diff.}{\sigma_{diff.}}$	3.0303	.5653	2.4369	1.1779	2.9740	2.9740	1.5113	3.7383	1.5607	.2816	.2819

	Personality variables	T C	M P	M S	M C	C	I	R	Cp	S-E-S	I Q	T
10%$_H$	N	19	19	19	19	17	19	15	19	19	17	19
	M	2.6	18.8	14.7	15.8	3.4	3.3	2.9	2.6	40.5	103.7	2.6
	σ_m	.22	.52	.66	.64	.16	.17	.23	.17	2.62	2.25	.17
10%$_L$	N	19	19	19	19	15	18	17	19	19	19	19
	M	2.8	17.6	13.8	16.0	3.8	3.9	3.3	3.0	37.3	101.4	3.1
	σ_m	.20	.52	.88	.65	.18	.16	.19	.10	2.39	2.05	.12
	$\frac{Diff.}{\sigma_{diff.}}$	.6726	1.6318	.8182	.2193	1.6611	2.5696	1.3409	2.0284	.9023	.7556	2.3979

TABLE 39

Ns, MEANS, σ_ms, $\frac{Diff.}{\sigma_{diff.}}$s OF PERSONALITY-VARIABLE SCORES MADE BY Ss WITHIN APPROXIMATELY HIGHEST AND LOWEST 10 PER CENT OF SERIAL DISTRIBUTION OF P_2 VALUES

	Personality variables	Y	Z	A-S	A	B	K	Li	Ls	B-I	T-W	T S
10%H	N	19	19	19	19	19	19	19	19	19	19	19
	M	3.5	3.1	—6.5	3.1	2.8	2.2	3.8	4.0	—38.3	4.0	6.7
	σ_m	.13	.13	4.66	.06	.11	.11	.13	.15	9.90	.23	.26
10%L	N	20	20	20	20	20	20	20	20	20	20	20
	M	2.8	3.4	.6	3.2	3.1	1.9	3.4	3.3	—54.2	4.2	6.6
	σ_m	.14	.10	2.93	.08	.10	.09	.15	.17	9.31	.25	.26
	$\frac{Diff.}{\sigma_{diff.}}$	3.6630	1.8293	1.2898	1.0000	2.0174	2.0174	2.0151	3.0878	1.1700	.5952	.2722

	Personality variables	T C	M P	M S	M C	C	I	R	C_p	S-E-S	I Q	T
10%H	N	19	19	19	19	15	18	17	19	19	19	19
	M	2.8	17.5	13.8	15.8	3.7	3.8	3.2	2.9	37.4	102.6	3.0
	σ_m	.20	.76	.88	.63	.20	.17	.20	.11	2.61	1.94	.13
10%L	N	20	20	20	20	19	19	16	20	20	19	20
	M	2.6	18.3	14.3	15.4	3.3	3.2	2.9	2.7	38.9	104.4	2.7
	σ_m	.19	.49	.66	.61	.15	.16	.21	.14	2.68	2.11	.17
	$\frac{Diff.}{\sigma_{diff.}}$	.7249	.8846	.4545	.4562	1.6000	2.5696	1.0345	1.1236	.4010	.6230	1.4018

TABLE 42

Ns, Means σ_ms, $\frac{Diff.}{\sigma_{diff.}}$s of P_3 Values Made by S's within Approximately Highest and Lowest 10 per Cent of Serial Distribution of Personality-Variable Scores

	Personality variables	Y	Z	A-S	A	B	K	Li	Ls	B I
10%H	N	20	12	18	19	21	23	20	18	19
	M	255	279	277	275	268	269	269	265	293
	σ_m	5.84	6.25	6.96	6.99	8.57	5.59	7.04	5.74	13.68
10%L	N	15	16	20	18	25	19	17	18	21
	M	289	274	292	274	249	295	278	292	264
	σ_m	8.65	8.31	5.95	7.53	7.24	6.74	6.84	6.20	8.30
	$\frac{Diff.}{\sigma_{diff.}}$	3.2577	.4814	1.6382	.0930	1.6936	2.9692	.9169	2.3203	1.8124

	Personality variables	M P	M S	M C	S-E-S	I Q	C	I	R	Cp
10%H	N	20	15	14	21	24	21	17	25	22
	M	267	276	272	270	266	278	266	269	266
	σ_m	4.52	8.24	7.55	4.93	5.31	5.46	7.51	5.29	6.02
10%L	N	22	14	13	20	16	20	14	12	21
	M	281	275	282	274	276	297	287	278	282
	σ_m	5.50	8.62	5.27	6.40	6.72	6.36	8.46	8.76	5.55
	$\frac{Diff.}{\sigma_{diff.}}$	1.9665	.0659	1.1759	1.7351	1.1576	1.5524	1.8326	.8794	1.9541

TABLE 43

Ns, Means, σ_ms, $\frac{Diff.}{\sigma_{diff.}}$s of P_a Values Made by S's within Approximately Highest and Lowest 10 per Cent of Serial Distribution of Personality-Variable Scores

	Personality variables	Y	Z	A-S	A	B	K	Li	Ls	B I
10%H	N	20	12	19	19	19	23	20	18	19
	M	265	277	284	280	311	276	279	273	292
	σ_m	5.70	7.59	7.89	7.14	11.16	5.34	6.93	4.25	10.27
10%L	N	15	15	20	18	23	19	16	18	20
	M	304	276	306	280	275	316	293	294	271
	σ_m	10.08	6.93	8.47	7.19	5.24	8.48	11.17	8.25	8.66
	$\frac{Diff.}{\sigma_{diff.}}$	3.1336	.0973	1.8142	0	2.1920	3.8731	1.0650	2.2629	1.5634
	Personality variables	**M P**	**M S**	**M C**	**S-E-S**	**I Q**	**C**	**I**	**R**	**Cp**
10%H	N	20	13	13	21	24	21	17	25	22
	M	276	281	269	283	294	277	271	272	270
	σ_m	6.55	8.65	8.57	7.39	6.72	6.28	9.98	6.01	8.27
10%L	N	22	14	18	19	16	20	14	12	21
	M	291	294	300	282	275	291	291	280	292
	σ_m	8.34	10.54	6.79	6.53	6.60	6.95	10.17	9.56	7.56
	$\frac{Diff.}{\sigma_{diff.}}$	1.4147	.9534	2.8355	.1014	2.0175	1.4946	1.4036	.7084	1.9634

TABLE 44

Ns, Means, σ_ms, $\frac{Diff.}{\sigma_{diff.}}$s of P_s Values Made by S's within Approximately Highest and Lowest 10 per Cent of Serial Distribution of Personality-Variable Scores

	Personality variables	Y	Z	A-S	A	B	K	Li	Ls	B I
10%H	N	20	12	18	19	19	23	20	18	19
	M	478	512	520	525	572	517	518	495	545
	σ_m	14.32	17.09	15.32	11.20	14.10	10.51	14.91	9.25	12.28
10%L	N	15	16	20	18	23	19	17	18	21
	M	558	522	560	528	[illegible]	562	564	544	494
	σ_m	17.77	19.36	13.61	14.93	9.45	14.09	15.73	13.27	15.37
	$\frac{Diff.}{\sigma_{diff.}}$	3.5054	.3872	1.9519	.1611	3.0047	2.9582	2.1224	3.0309	2.5924

	Personality variables	M P	M S	M C	S-E-S	I Q	C	I	R	Cp
10%H	N	20	13	14	21	24	21	17	25	22
	M	515	528	524	[illegible]	543	518	495	517	486
	σ_m	10.03	17.78	20.05	9.69	9.51	14.88	16.19	10.93	15.11
10%L	N	22	14	18	[illegible]	16	20	14	12	21
	M	548	[illegible]	551	[illegible]	[illegible]	548	546	549	548
	σ_m	9.99	15.28	[illegible]	[illegible]	13.49	13.26	17.79	16.23	11.42
	$\frac{Diff.}{\sigma_{diff.}}$	2.3311	.5497	[illegible]	.7401	.4453	1.5052	2.1202	1.6354	3.2735

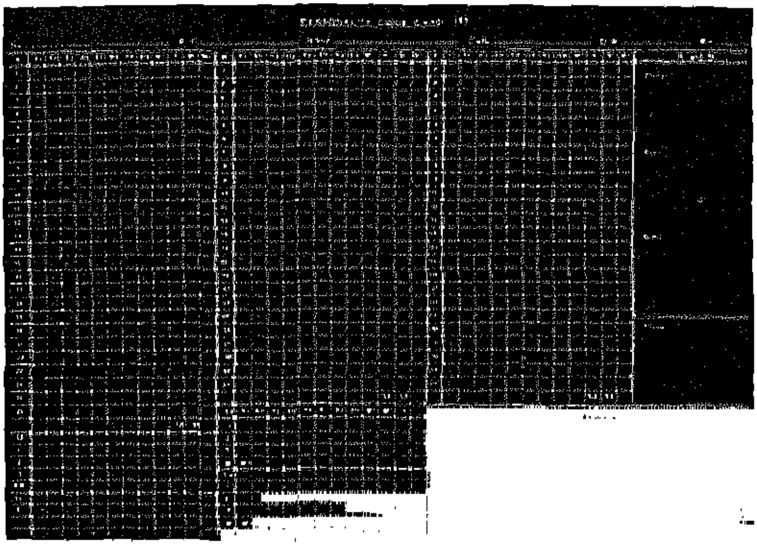

FIGURE 1
FACSIMILE OF P. C. C. 1

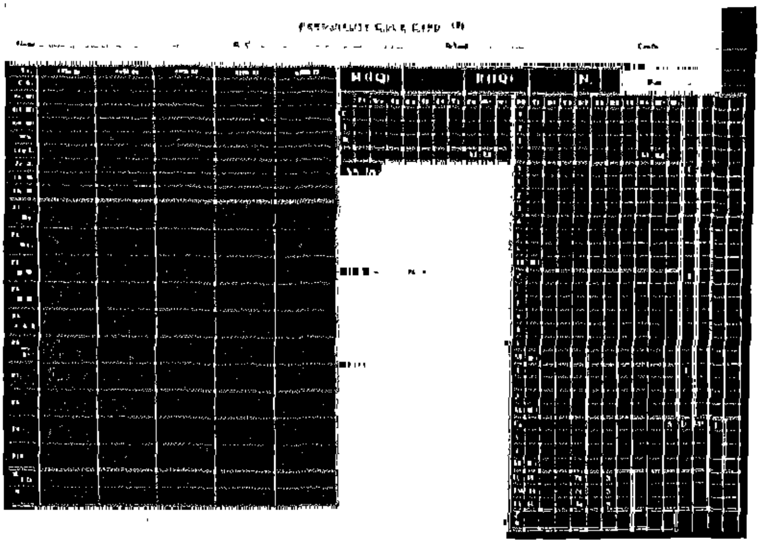

FIGURE 2
FACSIMILE OF P. C. C. 2

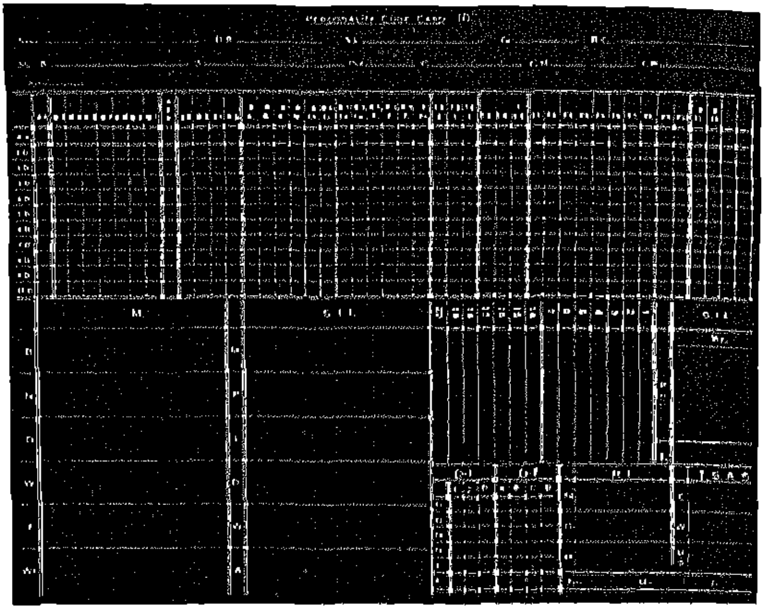

FIGURE 3
Facsimile of P. C. C. 3

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EDITED BY
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Charlotte Bühler
Universität, Wien

William H. Burnham
Clark University

Cyril Burt
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Harvard University

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Medico-biological Institute, Moscow

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Kyoto Imperial University

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C. J. Warden
Columbia University

John B. Watson
New York City

Helen Thompson Woolley
Teachers College, Columbia University

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(Manuscripts are printed in the order of final acceptance)

BEHAVIOR PROBLEMS OF ELEMENTARY SCHOOL CHILDREN: A DESCRIPTIVE AND COMPARATIVE STUDY 123

By Isabel Young-Masten (Isabel Scott Young)

GRAPHIC REPRESENTATION OF A MAN BY FOUR-YEAR-OLD CHILDREN IN NINE PRESCRIBED DRAWING SITUATIONS 183

By Pearl Farwell Gridley

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BEHAVIOR PROBLEMS OF ELEMENTARY SCHOOL CHILDREN: A DESCRIPTIVE AND COMPARATIVE STUDY*

A dissertation presented to the Faculty of the Graduate School of Yale University in candidacy for the degree of Doctor of Philosophy
1932

ISABEL YOUNG-MASTEN
(Isabel Scott Young)

The Department of Education, Yale University

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ISABEL YOUNG-MASTEN

1424 EAST 10TH AVENUE
DENVER, COLORADO

I. INTRODUCTION: PURPOSE AND BACKGROUND OF THE STUDY

The public school environment represents for most children the *situation in which they must make their first conscious adjustment* to many conditions which they have never encountered before. Many children fail, either temporarily or permanently, to make this adjustment satisfactory, and conflicts arise that may cause personal unhappiness or a lessening of social usefulness. A decade of research has yielded much of value concerning the maladjustments of public school children. Case-study methods have been used with small groups of children whose difficulties have taken them to social agencies or made them the objects of special study. Statistical methodology has been used to study the incidence of behavior difficulties among all the children in one school or in several schools.

Only a beginning, however, has been made in identifying what constitutes behavior difficulties in public school children, and nothing has been done toward studying at close range in the schoolroom the behavior of maladjusted school children as compared with the behavior of children average in behavior. The two purposes of the present investigation were: (*a*) to find out the extent of maladjustment *and the kinds of difficulties manifested by the oustanding* behavior problem children in the elementary schools of a whole city; (*b*) to *find* out what *differences* were observable *in the* classroom behavior of a small group of such problem children and an equivalent group whom their teachers had called average in conduct, who were in the same grades and with the same teachers as the problem children.

It is admittedly true that the adjustment that any child makes to a situation depends upon two factors: his individual characteristics, and the nature of the existing situation which he may be called upon to meet at any particular time. Many of the studies that have been made of the adjustment of the child to school have dealt with certain factors that may affect his adjustment.

Dr. Eleanor H. Johnson studied the relation between retardation and maladjusted behavior. Her groups of 107 truants and 123 school *problems, selected at large from* the school in which she worked, were compared in respect of mental status, conduct, and *environment, with control groups that showed no conduct disorders.*

The children studied were all boys. She found that retardation and misconduct often go hand in hand, but that misconduct might be either a cause or an effect of the retardation (8, p. 60). Richards made complete case studies of 46 maladjusted children in a Baltimore school. The children were studied from these standpoints: (*a*) the complaint which had been made; (*b*) school history, which included a psychological examination; (*c*) personality traits; and (*d*) home background. Of the 46 children referred to her, 35 were having trouble in keeping up their grades, and 16 were mentally retarded from three to six years. The peculiar difficulties for which each child was referred could in practically every case be traced back to their first appearance in the very early years of school. In the majority of the cases it was found that the maladjustment had had its beginnings in the home, and had been carried into and through the child's school life with the most frequent result of retardation (15, p. 709). Paynter and Blanchard report findings on 167 children examined at the demonstration guidance clinic in Los Angeles and 163 at a similar clinic in Philadelphia. As a part of the intensive study made in the clinics of the behavior and personality difficulties of the children, all cases were tested with educational and mental tests, including the Stanford-Binet Intelligence Test and the Stanford Achievement Tests. The children with intelligence quotients below 80 were eliminated from the study of maladjusted groups. These authors concluded that while the educational success of the children whom they studied had not been impaired to any great extent by their behavior difficulties, they were being ill prepared for the demands of maturity. Half of the children in the Los Angeles group and nearly three-fourths of the Philadelphia cases were recognized as problems despite the fact that the maladjustment was shown in ways other than that of poor scholastic standing. These investigators concluded that at least tentatively, it was safe to say that problem children (14, pp. 62-3) showed no general tendency to low educational achievement.

The next two studies to be reported dealt with the incidence of behavior problems in all the school children in an individual school and the relation of the behavior difficulties to such factors as intelligence and age. The behavior of all the children (843) in one public school in Montreal was investigated by Blatz and Bott. The teachers were asked to keep a record of the misdemeanors which occurred in their rooms from day to day. While the number of boys and girls was about the same, the number of misdemeanors reported for boys was far greater than that for the girls. The frequency of misdemeanors was not closely related to chronological age. It varied inversely with the intelligence quotient for the boys in the school, but not for the girls (1, p. 381). Haggerty investigated the incidence of undesirable behavior in 800 children in a public school in Minneapolis. Each teacher was given categories of behavior and asked to catalog according to these categories, frequency of the occurrence of undesirable behavior for each of the children in her room (2, p. 104). The results for sex were very similar to those found by Blatz and Bott: the boys, according to their teachers, manifested a larger number of problems than did the girls. In relation to age, there was no one year without pronounced evidences of behavior difficulties, although Haggerty reported a slight rise in the figures reported for the year level 11 to 12 (2, p. 110). The per cent of undesirable behavior was lowest at 100 *IQ* and rose with variation in either direction, although the most rapid rise was toward the lower end of the intelligence scale (2, p. 114).

Using the findings from the Haggerty study as a starting point for his further research, Wickman has made a most valuable contribution in emphasizing the need for a scientific attitude toward children's behavior, and has shown what constitutes maladjustment for teachers and for mental hygienists. He secured ratings from 511 elementary school teachers and 30 mental hygienists on 50 problems of child behavior and then compared the ratings. A decided difference of opinion was revealed between the two groups of raters concerning what constituted a behavior problem in children and the relative seriousness of problems in children. The "attacking" forms of behavior, such as sex offences, stealing, lying, disobedience and defiance were given high ranks in the teachers' ratings, probably because these modes of behavior interfere with the smooth running of the school and frustrate the teacher's authority. The mental hygienists took as their criterion the future adjustment of children and considered the "withdrawing, recessive personality and behavior traits" as the most serious. Of the 12 problems rated high in seriousness by the teachers, only cruelty or bullying was high on the list of the clinicians. "Unsocialness" was given first place by the hygienists and fortieth by the teachers (18, p. 72).

As an illustration of the attempt to rate behavior by means of a rating scale and as an outgrowth of the work done by Wickman, the study made by Olson (13) should be cited. He revised *Schedule A, Behavior Rating Scale,* which had previously been formulated by Wickman. Teachers in a Minneapolis public school rated their children on the list of behavior problems given on the scale, where provision was made also for rating according to the frequency of the occurrence of the problem. The frequencies of the record were weighted and the summation gave the child's general tendency to behave atpyically. The higher the child's score, the more general and serious the problems. Dr. Olson also revised *Schedule B, Behavior Rating Scale,* which had been formulated by Wickman. *Schedule B* was a five point "descriptive" phrase scale for rating on 35 traits "regardless of whether or not the behavior described would be called a behavior problem." Olson studied the relationships between the scores obtained by the use of the two scales for the same groups in relation to the factors of sex, school achievement, and intelligence. He found that the boys had a higher mean score than the girls, which indicated more problems, and that low intelligence in his groups tended to be associated with a higher behavior deviation score. He found, however, that there was a higher correlation between the behavior ratings and achievement scores than between the behavior ratings and intelligence test scores.

Yourman (19) made an investigation of maladjustment in "alternate grades of twelve representative elementary schools" in New York City. Each teacher in these grades was asked to designate the two children who were the outstanding behavior problems. When the names of 200 children had been given, the teachers were asked to give, as concretely as possible, the specific difficulties which had led them to name these children as problems (19, p. 334). The problems manifested were mainly those of "attacking" types of behavior. These results were consistent with those obtained by Wickman (18). The problem children were then compared with children of four fifth grades as representative non-problem controls on certain factors of intelligence, social and economic status, emotional stability, home background, and behavior. In a comparison of the children identified by their teachers as problems with non-problem school children, the problem group were shown to be dull-normal in intelligence and greatly retarded educationally, they came from somewhat less desirable homes; found school unsatisfying, were involved in conflicts with the school and with authority generally, and reacted to these conflicts with a "resistant and aggressive behavior of an anti-social type" (19, p. 337).

Throughout the studies mentioned, there was an apparent effort, either by case-study or statistical methodology to view the maladjustments of school children objectively. The investigations in which case-study methods were used sought the cause of the maladjustment through a study of special factors in the problem. The statistical studies attempted to find the incidence of maladjustment or to evaluate the behavior by means of expert opinion or by rating scales. This investigator acknowledges much valuable help from these studies.

II. THE APPROACH TO THE PROBLEM: METHODS OF INVESTIGATION

The present research attempts to carry forward the study of maladjustment among elementary school children. It includes a city-wide investigation of maladjustment as judged by elementary school teachers and principals; objective classroom observation and record of the behavior of a group of these problem children and of a control group in the same classrooms, selected by their teachers as being average in behavior; and finally, comparison of the types of observed behavior exhibited by the problem and average groups.

The public schools of New Haven, Connecticut, offered a satisfactory and cooperative field for this research. Its school population was large enough and sufficiently varied racially, economically, and socially to insure a fairly wide sampling of problems among school children. The administration was in sympathy with the investigation and extended the co-operation of the city elementary teachers and principals.

The concern of the investigator was with children in public schools whose social adaptation to a situation common to all children in a community was sufficiently at variance with the established order to make them stand out among their classmates as problems, rather than with the one per cent of the population that finds its way into a correctional type of institution. These children constituted a selected group, in that teachers and principals considered them the most seriously maladjusted pupils in their respective rooms. They represented the dramatic cases—the boys and girls who, day in and day out, annoyed the school community by word and by deed. They had impressed themselves upon the minds of their teachers until the latter had associated their every undesirable act with repeated misbehavior.

The data for the study were secured at the mid-year in February. The children reported were, therefore, those whose troublesome behavior had probably persisted throughout the first semester. They had identified themselves, at least in the minds of their teachers, as presenting problems. So far as the investigator knew, very few of them had ever been referred to any out-of-school agency. According to the data secured, one child, a kindergartener, was being studied by the guidance clinic. This child had been referred to the clinic at the suggestion of the mother. One special-class boy was listed "on probation" from the children's court. During the course of the investigation one seventh grade boy was sent to "reform school."

The study was divided into two phases: the extensive study or survey, to find the range and kinds of problems shown by behavior problem children in the city's schools; and the classroom observational study of smaller groups of problem children, selected from the lists submitted by teachers, and a group average in conduct, in the same grades and with the same teachers as the problem group.

The methods used in the first phase of the study, that is, the survey for problem children, were, briefly, as follows:

1. The principals and teachers individually reported by questionnaires (called *Schedule 1* and *1-a* respectively)[1] the names of the children whom they considered their most seriously maladjusted children and the problems that each child presented. No categories of behavior, such as Haggerty (2) used, were given to teachers and principals. It was believed that, although terminology might differ, they could report better the behavior of the children if they were given freedom to list it in their own way.

2. On the return of Schedules 1 and 1-a to the investigator, the principals and the teachers were asked to keep a record (called Schedules 2 and 2-a respectively) over a specified period of five consecutive days the names of the children who gave them trouble during that period, the behavior that was unsatisfactory, and the teacher's method of handling this behavior.[2]

3. In order to get teachers' reactions to the children's habitual mode of response on certain items, teachers in selected schools which had submitted lists of children on the questionnaires requested under 1 and 2 above were asked to rate their problem children on a conduct record blank. The "C.E.I." Conduct Record blank, which had been designed to get a measure of the subject's general reputation, was used. This blank had been formulated by the Character Education Inquiry for the studies conducted by May and Hartshorne, and is reported in the volumes, *Studies in Service and Self-Control* (4) and *Studies in the Organization of Character* (5).

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[1] Copies of all Schedules used are given in the Appendix, pp. i-v, in the dissertation on file in library of Yale University.

[2] Returns were unsatisfactory from the request for the teacher's methods of handling the behavior, so were not reported in the dissertation.

4. Teachers in the schools that rated the children on the Conduct Record were asked to check the characteristics of their problem children on two forms, *A* and *B* of a check-list. These check-lists, like the Conduct Record, had been designed as a measure of general reputation and are also reported in the two volumes cited above.

Since this phase of the study was in some measure a repetition of work done by other investigators in the field of child conduct, only a comprehensive summary of this phase is included in this published report.[8]

The second phase of the investigation was an intensive and comparative study of a group of behavior problem children with a group who were considered "average" from the standpoint of teachers' conceptions of satisfactory school behavior. The methods used in this phase were, briefly, as follows:

1. Classroom Observations, each 15 minutes in length, were made at different times of the day on each child in both groups. A minimum of 10 observations was made on each of the 56 children carried through to the end of the study. In all, a total of 595 classroom observations were made. The observations were made by the investigator on one child at a time, and no categories were used in making these observations. The actual observations in the study covered a period of approximately three months, from March 16, 1931 to June 10, 1931.

2. At the close of the observation period, each child in both groups was given a Stanford revision of the Binet Intelligence Examination by the investigator.

3. In so far as it was possible to secure it, the child's school history was studied for a record of his retardation, acceleration, and results of standardized tests.

4. Teachers were asked to rate their two "worst" children, their two "average" children, and their two "best" children on a symptom sheet of 41 definite items concerning school behavior.

5. In an informal interview with each teacher, information was secured concerning her attitude toward her problem children.

Since it was this phase of the study which was unique in its approach, the data and findings from it constitute the major part of this published report.

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[8] The complete dissertation is filed in the Library of Yale University.

III. SUMMARY OF PHASE I OF THE STUDY: THE SURVEY FOR BEHAVIOR PROBLEM CHILDREN

A. Purpose of the Survey

The purpose of the survey was to find out what was the extent and what were the kinds of behavior problems of the elementary school children whom teachers and principals in a whole city considered their out-standing behavior problems.

B. Means of Securing Data

1. Schedules sent to teachers and principals, which were designed to discover the extent of maladjustment in the city schools; the kinds of problems that the maladjusted children showed; and the frequency of these problems over a specified week.

2. A rating blank (*The Conduct Record Blank,* devised by the Character Education Inquiry) and two forms of a check-list (Forms A and B, devised by the Character Education Inquiry) were (3, 4, 5) sent to certain schools in different parts of the city for a rating of conduct by the teachers on children who had previously been reported as behavior problem children.

C. The Findings from this Survey

1. On Schedule 1-a, 334 elementary teachers from 94 per cent of the elementary schools of New Haven, Connecticut reported 1150 children (901 boys and 249 girls), from the kindergarten through the 8th grade and including the special classes, as outstanding behavior problems. This was approximately one in every ten children enrolled in the schools which reported.

a. Of the children reported on Schedule 1-a, 37 per cent were of native-born stock; in 60 per cent of the cases the fathers were foreign-born; and in 3 per cent of the cases no nationality was given. In the public schools of New Haven the nationality of children is recorded as the nationality of the father, so the investigator had no record of the number of children who were themselves foreign-born. The percentages of children of native-born and foreign-born parentage were, however, proportionally the same when the total number of children in the city schools of native-born and foreign-born stock was used as the base.

b. According to the Strayer (16) standard for grade-placement, 40 per cent of the children reported on Schedule 1-a were "above grade" for life-age; 32.7 per cent were "at grade" for life-age; and 27.3 per cent were "below grade" for life-age. Proportionally, there were 2½ times as many children "below grade" for life-age in the reported group as in the city school population; and only half as many "above grade" children in the reported group as in the city school population.

c. An analysis of the behavior problems according to the Wickman (18) classifications showed violations of classroom and work rules to be the conduct disorders of highest incidence for both boys and girls reported on Schedule 1-a. "Talking without permission" was reported for 50.5 per cent of the boys and 57 per cent of the girls: "inattention," a violation of work rules, was reported for 24.9 per cent of the boys and 28.9 per cent of the girls.

d. No statistically significant differences were found in the behavior difficulties between any consecutive grades or between any one age-level and the succeeding age-level, when the difficulties as given on Schedule 1-a were compared.

e. A comparison of the number of behavior difficulties reported for the children "above grade" for life-age with those "below-grade" gave a significant difference of 3.65 sigmas. A difference of 2.54 sigmas was obtained when the difficulties of the "at grade" group were compared with those of the "above grade" group; and a difference of 1.15 sigmas was obtained when the difficulties of the "at grade" group were compared with those of the "below grade" group.

2. Twenty-three elementary principals reported 281 children on Schedule 1 as outstanding behavior problems for their buildings. Two hundred twenty-four of these 281 children had also been reported as problems by their teachers on Schedule 1-a.

a. Boys outnumbered girls reported by the principals 5 to 1. The grade range was the same as given on Schedule 1-a.

b. Difficulties showing the highest incidence were the same on the principals' schedule (Schedule 1) as for the teachers' (Schedule 1-a). "Talking without permission" was reported by the principals for 33.9 per cent of the boys and 33.4 per cent of the girls: "inattention" was reported for 30.9 per cent of the boys and 10.4 per cent of the girls.

3. On Schedule 2-a, 156 teachers reported the names of 435 children (319 boys and 116 girls) as children who had given them trouble during a specified week.

a. One hundred ninety-three of the 435 children reported on Schedule 2-a had been previously reported by teachers on Schedule 1-a as behavior problems.

b. "Talking without permission" was again ranked highest as the problem most frequently encountered during the specified week, for 38.9 per cent of the boys and 50 per cent of the girls were thus reported.

4. On Schedule 2, 26 elementary principals submitted the names of 159 children who had been sent to their offices during the week.

a. The names of only 61 of these children had been on teachers' Schedule 2-a.

b. Disobedience ranked highest in frequency for the boys on this schedule; 23.9 per cent of the boys were thus reported; disorderliness was the most frequent problem manifested by the girls, 23.1 per cent of the girls were referred to the offices for this offense.

5. The Conduct Record Blanks which consisted of 22 different characteristics (as Reliability, Industriousness, Co-operation, etc.) were checked by 111 teachers for 385 children (302 boys and 83 girls).

a. Comparison of the best and poorest degrees of adjustment within each characteristic on the Conduct Record Blank showed the largest percentage of both boys and girls at the poorest degree of adjustment.

b. Teachers rated their children with some degree of reliability as shown by a scattergram of split-half of scores for children given ratings on all characteristics.

6. Paired forms of the Check-list were returned for 269 children (211 boys and 58 girls).

Tabulation of 10 most frequently marked words on each form (approximately 80 words on each form) showed both boys and girls marked on 7 of the 10 words. No one of these 7 words had a favorable connotation.

IV. A COMPARATIVE CLASSROOM STUDY OF A PROBLEM AND AN AVERAGE GROUP

A. The Children—Their Selection

As stated in the introduction to the study, the purpose of this phase of the investigation was to take from the total group of behavior problem children a smaller group and to make a comparison of the behavior of this group with an average group—that is, average from the standpoint of adjustment to the teacher's conception of school behavior. This comparison was made on the basis of relative amounts and kinds of overt behavior manifested by each group of children.

All of the children selected were in the first six grades of elementary schools. The schools selected for the observational study were chosen largely on the basis of willingness to co-operate, as evidenced by the teachers and principals during the progress of the survey for problem children. The school populations of these schools, however, represented a cross-section of the city's social, economic and racial life. Each school had an enrolment of approximately five hundred children.

Naturally, it was not possible to observe in the selected schools all of the children whom any one teacher had listed, but the observer made an effort to study one problem school child and a control child in each room from which a list had come. After several unsuccessful attempts on the part of the investigator to maintain the anonymity of the child, this procedure was dropped and the teacher was told the name of the child in whom the investigator was interested. The teachers themselves were very much interested, and extended very consistent co-operation. They had been told that at any time, they might request the investigator to remain away from their room on any day. Not once during the course of the investigation did a teacher avail herself of this privilege.

Forty-one problem children were selected for the classroom study. They were in all grades, from the first through the sixth. As was to be expected in a public school situation, some of the children were dropped, for one reason or another, during the progress of the study. Four were transferred to other schools in the city. Two others were taken out of school because of physical conditions. Two more had such irregular attendance that, at the suggestion of their teachers, they were dropped from the study. One boy who had been given a psychological examination was found to be decidedly subnormal and was eliminated. A teacher's physical condition was given by a principal as the reason for the failure of her children to adjust, and in order to prevent any further strain, the investigator withdrew. As a result of these losses, only 28 problem children were carried through to the close of the study, and hereafter this is the group that is considered.

In order to make a study of the relationship between this group of problem children and a group which the teachers considered as making an average adjustment to school, each teacher in whose room there was a behavior problem child to be studied was asked to designate a child whom she considered to be making an average adjustment to classroom discipline. She was asked to indicate the position of this child in relation to age and intelligence for the group in which he was placed. There were 28 children in the average group.

No sex distinction was made throughout this part of the investigation. There were, however, 4 girls and 24 boys in the problem group, and 6 girls and 22 boys in the average group.

B. The Procedure

Because this was an investigation of classroom behavior, the most complete study was made of the child's reactions to classroom situations. This was done through a series of classroom observations on each child in both the problem and the average groups. Although the number of observations made on each child varied slightly, a minimum of 10 observations, each 15 minutes in length, was made on each child. This was a minimum of 150 minutes of direct classroom observation for each child observed. A total of 595 observations was made on both groups of children. No child was observed more than once in the same half day. The actual observations in the study covered a period of approximately three months, from March 16 to June 10, 1931. Each child was observed at least once in every activity of the school program.

The observer used an ordinary wrist-watch as the timing instrument, and the time of beginning and ending each observation was noted on the sheet used by the investigator. If a change of activity occurred during the observation, this, too, with the time of change, was noted. Day and date were also recorded. Only one child was observed at a time, and the observer sat where she faced the child, yet did not interfere with the work of the class. In not a single instance, so far as any teacher discovered, did a child associate the presence of the investigator with his classroom conduct. No behavior categories were used in recording the data for the children, but an attempt was made to record all overt behavior of each child as it occurred during the classroom activity in which he was observed. It was hoped by this method to get a cross-section of the child's school behavior in its actual setting, not in one constructed for the purpose.

Each child in both the problem and the average groups was given a psychological examination for which the Stanford revision of the Binet-Simon scale was used. In order that the child might remain unaware that he was being observed, and that the investigator might be free from the bias which a knowledge of his score might create, this intelligence examination was made at the close of the classroom observation period of the child's behavior. At the close of the examination the investigator made an attempt to get from the child his reactions in terms of what he liked best to do in school and in terms of his relation to his teacher and to the other children in the group.

While records of educational tests were not available for all the children studied because the city did not have a general testing program, many of the children had been given at a previous date either a Gates *Primary Reading Test* or some form of the Stanford Achievement Test. Similarly, the city had no general cumulative record system, consequently, any data concerning retardation, special abilities or disabilities of the child had to be secured from the teacher, the principal, or the child himself.

In order to find out how the problem children would compare with the average children on a symptom sheet of 41 definite items, the teachers of these children were asked to check, on the basis of frequency and seriousness, the two "worst" children, the two "average," and the "best" children in their rooms. The items on the symptom sheet were taken from the original list of behavior problems that the teachers had mentioned on Schedule I-a which had been used in the first phase of the study. (That is, the survey for problem children in the whole city.)

As a means of getting some idea of the teachers' attitude toward their problem children, the investigator, in an informal interview, asked certain questions of the teachers. There were eleven questions, the first three of which were "buffer" questions. The questions in the interview were asked usually at the first observation made in each room, the interview serving as a means of getting acquainted with the teachers and their classroom situations. The answers to the questions were not written in the presence of the teacher. The questions were designed to bring out the teacher's ideas on each child's individual difficulties; the causes of the difficulty; and her acquaintance with the child, either personally or by reputation, before he came to her room.

V. COMPARATIVE DATA CONCERNING THE PROBLEM AND AVERAGE GROUPS

A. EDUCATIONAL STATUS

For the purpose of giving a concise picture of the educational status of the two groups of children, the findings are reported by tables and charts where the data warrant it. As was indicated earlier the numbers of children were too few to justify any sex distinction. In Table 1 is given the grade and section within grade for each group of children. It will be noticed that the children in the problem group were divided equally between the "*A*" and "*B*" sections of their grades, while of the average group seven in every ten children were in the "*A*" divisions, and approximately three in every ten were in the "*B*" divisions. The "*A*" division represented the high division of the grade, and the "*B*" represented the low division within the grade.

TABLE 1

DISTRIBUTION OF CHILDREN BY GRADE AND SECTION

Problem Children				Average children			
Grade		Section		Grade		Section	
		A	*B*			*A*	*B*
First	6	3	3	First	6	4	2
Second	3	0	3	Second	3	2	1
Third	5	3	2	Third	5	4	1
Fourth	5	3	2	Fourth	5	3	2
Fifth	6	4	2	Fifth	6	5	1
Sixth	3	1	2	Sixth	3	2	1
Total	28	14	14	Total	28	20	8
Per cent		50.	50.	Per cent		71.4	28.6

"*A*" indicates the high section of the grade and "*B*" the low section.

The distribution of intelligence quotients as measured by the Stanford Revision of the Binet test is given in Table 2 for the two groups of children. The intelligence quotients ranged from 70 to 121 in the problem group, and from 77 to 141 in the average group. The median for the problem group was 94.6, with the middle 50 per cent of the cases between 86.7 and 102.5; while the median for the average group was 100, with the middle 50 per cent of the cases between 92.4 and 107.6. When treated statistically, there was not a reliable difference between the intelligence quotients for the two groups.

TABLE 2

DISTRIBUTION OF CHILDREN BY INTELLIGENCE QUOTIENTS

Intelligence quotient	Problem children No.	Problem children %	Average children No.	Average children %
70-79	4	14.3	1	3.6
80-89	4	14.3	2	7.1
90-99	11	39.3	11	39.3
100-109	6	21.4	8	28.6
110-119	1	3.6	4	14.3
120 and above	2	7.1	2	7.1
Total	28	100.	28	100.
Median	94.6		100.0	
Mean	95.5		102.3	
Q	7.9		7.6	

Grade-placement for life-age and for mental-age was computed upon the basis adopted by Strayer (16). According to the Strayer standard, a child is making normal progress if he is in the first grade and not yet eight years of age, if he is in the second grade and not yet nine, and so on. The data concerning grade-placement for life-age and for mental age for the two groups of children are given in Tables 3 and 4. Twenty-five per cent of the problem group and

TABLE 3

GRADE PLACEMENT IN RELATION TO LIFE-AGE

Grade placement in relation to life-age	Problem No.	Problem %	Average No.	Average %
Below grade	7	25.0	4	14.3
At grade	8	28.6	8	28.6
Above grade	13	46.4	16	57.1
Total	28	100.0	28	100.0

TABLE 4

GRADE PLACEMENT IN RELATION TO MENTAL AGE

Grade placement in relation to mental-age	Problem No.	Problem %	Average No.	Average %
Below grade	4	14.3	8	28.6
At grade	10	35.7	10	35.7
Above grade	14	50.0	10	35.7
Total	28	100.0	28	100.0

14.3 per cent of the average group were graded below for life-age; while 14.3 per cent of the problem group and 28.6 per cent of the average group were graded below for mental age. In other words, there were nearly twice as many children misgraded for life-age as for mental age in the problem group, and in the average group twice as many were mis-graded for mental age as for life-age.

The results of educational tests were available for just 50 per cent of the children; consequently, no effort was made to put these results into tabular form. Of the children who had been given tests, 14 had been given Types 1 and 2 or Types 2 and 3 of the Gates *Primary Reading Tests.* Only two of these children—one problem and one average child—had a "Reading Grade" score up to the standard for their grade. Both children had "Reading Ages" equivalent to their chronological and their mental ages. Of the remainder, nine children (four problem and five average) did not have "Reading Ages" comparable to their chronological and mental ages. Three children were reading as well or slightly better than their mental ages seemed to justify. The other 14 children for whom test results could be secured had been given some form of the new Stanford Achievement Test. The educational quotients ranged from 69 at the lower limit to 121 at the upper limit. At the lower limit was a problem child, while an average child was at the upper limit. The achievement ratios ranged from 80 to 117.

Reliable data on the previous school history of these children were very scarce, and it was particularly difficult to get facts concerning retardation or acceleration; only ten children, five in each group, at some time in their school experience had repeated a grade. Only two (one problem and one average) had been accelerated. The grade most commonly reported as repeated was the first grade. Seven of these children—five problem and two average—had repeated the first grade. This grade is, in general, the one most often repeated, and it is possible that for some of these children the beginning of their maladjustment was to be found here (15).

B. THE OBSERVATIONAL RECORDS

As has been pointed out in the preceding chapter, no categories were used in recording the observations made on these two groups of children in the classroom. A diary record form attempted to present the whole picture of the children's reactions while they were under observation. Desirable as this picture was, it was obviously impossible to make a comparison of the behavior of the two groups unless some categories common to both sets of observations could be applied. Consequently the observations were analyzed and the data from them classified under 46 categories designed to be mutually exclusive, so that a comparison might be made from one classification to another. The method of analysis was to count the occurrence of the behavior response. In order to have a point of departure, four major divisions for the analysis of the observations were first decided upon. These were: (*a*) observable responses involving self; (*b*) observable responses involving things; (*c*) observable responses involving other children; and (*d*) observable responses involving teacher and other adults. This original classification proved unsatisfactory because the divisions were too general. A refined classification, on the basis of the same major divisions, each broken up into more detailed categories, was made.

The refined classification was:

Classification I: Observable Responses Involving Self.

1. Facial responses (grimacing, twisting face muscles, blinking, winking, frowning).
2. Mouth responses (oral habits as sucking thumb, biting nails, etc.).
3. Head responses (pulling or twisting hair, scratching ears, nodding head, etc.).
4. Nasal responses (picking nose, scratching nose, etc.).
5. Body movements (wiggling, scratching body, manipulating parts of body).
6. Hand movements.
7. Locomotion (walking, running) (permissible).
8. Locomotion (walking or being out of his seat without permission).
9. Vocal responses (whistling, humming to self, talking to self.)
10. No overt reaction (day-dreaming).
11. Standing up in seat.
12. Sitting down in seat.

(Eleven and 12 were grouped separately from the other body movements because of different reactions that the teachers made to them.)

Classification II: Observable Responses Involving Things.

1. Manipulation of pencils, books, paper, moving chairs, etc.
2. Other forms of manipulation (rubbing desk, pulling handkerchief, playing with things).
3. Looks at objects in room (clock, pictures).
4. Looks at blackboard to get work from it.
5. Looks out of window, door, etc.
6. Writes or draws as part of work.
7. *Looks at book for reading, etc.*
8. Turns pages while reading or reciting.
9. Looks at papers on his desk.
10. Puts things into mouth.
11. Drops things on floor.

Classification III: Observable Responses Involving Other Children.

1. Observation of other children (looking at them, watching them).
2. Calls or talks under breath to another child.
3. Is talked to.
4. Smiles or laughs with or at another child.
5. Looks at other child's work.
6. *Contacts with other children (pushing, punching, hitting, etc.).*
7. *Takes things away from another child.*
8. *Accidental contacts (bumping, etc.).*

Classification IV: Observable Responses Involving Teacher or Other Adults.

1. Looks at teacher.
2. Looks at other adults.
3. Answers teacher's questions.
4. Ask teacher a question or talks to her.
5. Smiles at teacher.
6. Shows his work to teacher.
7. Teacher gives direction or command to him about work.
8. Teacher gives direction or command to group about work.
9. Teacher talks to him.
10. Teacher gives command to him about overt behavior.
11. Teacher gives command to group about overt behavior.
12. He obeys group command.
13. Teacher praises his work.
14. Teacher looks at him as behavior restraint or shakes head.
15. Teacher touches him as behavior restraint.

1. *Reliability of the Records.*

Since every observation included in the study was recorded by the investigator, it is safe to assume that each record is comparable to any other record, and that the percentage of error is constant. However, a measure of the reliability of these records on the children was secured by correlating the odd and even records for each group of children and then for the total group. The reliability was computed by the usual product-moment formula as given by Kelley (9, p. 180, formula 134). For the total group, the correlation between halves of the 560 fifteen minute observations was .72 with a probable error of estimate of .04. When the odd-even records of the average group were correlated, the coefficient was .76, with a probable error of .05. For the problem group it was .41 with a probable error of .11. When the Spearman-Brown Prophecy Formula (9, p. 205, formula 157) was used for the whole fifteen-minute period, these reliability coefficients became .84, .86, and .58 respectively. If problem behavior is highly variable, then it is to be expected that the same agreement between observations may be made. From an analysis of the records, the investigator believes that this factor of inconsistancy of problem behavior accounted to a large extent for the difference between the reliability coefficients for the two groups.

C. THE ANALYSIS OF THE OBSERVATIONAL RECORDS

The data from the observational records of the children were analyzed to show (*a*) relative frequency and kinds of behavior for each group in relation to the entire amount of behavior observed for both groups; (*b*) relative frequency of observed behavior in each major classification; (*c*) relative frequency and kinds of behavior observed within each major classification; (*d*) relation between the behavior of the problem and the average children on each category of responses; (*e*) the percentage relation between the behavior of the problem group and that of the average group; (*f*) a comparison of certain kinds of behavior in both groups; (*g*) relation between intelligence and observed behavior. Wherever it was possible, these analyses and comparisons are presented by means of tables and charts.

1. *Observed Behavior of Each Group in Relation to the Whole Amount Observed.*

Figure 1 shows the behavior of the two groups of children in relation to the total behavior which was observed. The chart brings

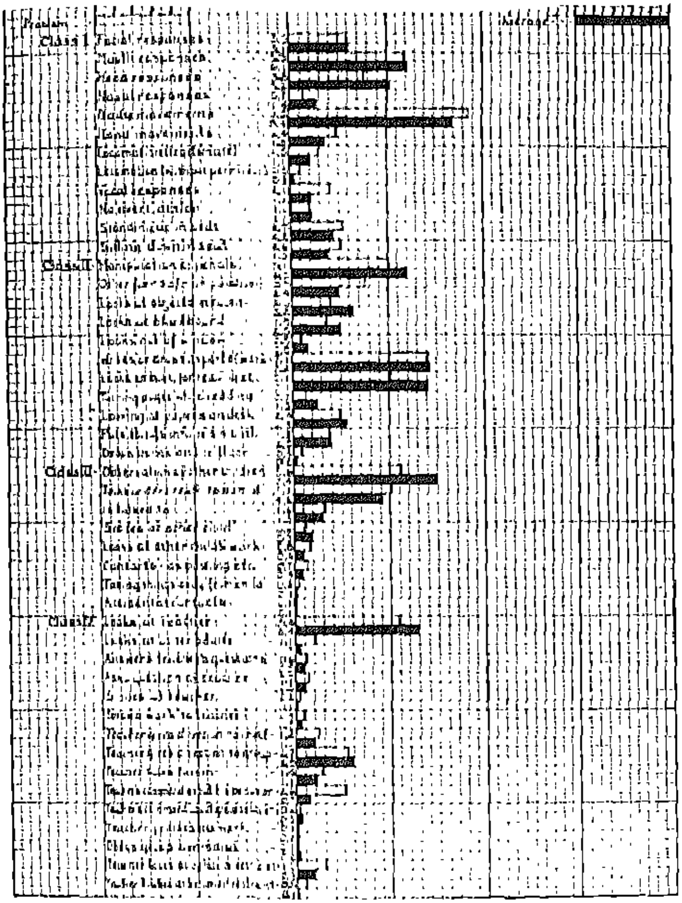

FIGURE 1

Percentage of Total Behavior Observed for Both Problem and Average Children

Based on total responses observed for each group.

out the striking fact that everything that the problem children did, the average children did, and, so far as these data reveal it, there were no differences in kinds of behavior shown by the two groups. Furthermore, when the observed behavior of the two groups was broken up into detailed categories, the percentage difference for any one item was almost negligible in most categories and small in others. Thus, in the category of "facial responses," as grimacing, twisting of the face muscles and other facial habits, there was reported 3.0 per cent for the problem group and 3.1 per cent for the average. When treated statistically, there was not a reliable differerence for any percentage difference between the two groups.

Table 5 gives the relative frequency of observed behavior in each major classification for both the problem and the average groups. It should be remembered that the recording and classifying of this behavior were quantitative and the desirability or undesirability of the behavior did not enter into the classification. It is worth noting, however, that in no classification was there more than 5 per cent difference between the amounts of behavior observed for the two groups in any one classification. In Classifications I and IV the problem group had a slightly larger percentage of responses reported, but the opposite was true in Classifications II and III, for in these two divisions the average children had the larger amounts of reported responses. The differences were too small to warrant any importance being attached to them.

TABLE 5

RELATIVE AMOUNTS OF OBSERVABLE BEHAVIOR FOR BOTH GROUPS OF CHILDREN IN EACH MAJOR CLASSIFICATION

Classification	Problem %	Average %
I. Observable Responses Involving Self	35.5	33.6
II. Observable Responses Involving Things	30.9	35.5
III. Observable Responses Involving Other Children	14.8	15.3
IV. Observable Responses Involving Teacher and Other Adults	18.8	15.6
Total	100.	100.

In order to present this behavior in a more detailed way and to indicate the kinds of behavior that the children showed during the observations, the four tables 6, 7, 8, 9 are given. Each classification was analyzed and summarized.

2. *Analysis of Observed Responses Involving Self.*

Classification I, which dealt with the responses which involved the children themselves, was probably the most objective of all the classifications, for it was admittedly easier to record a body movement than it was to determine whether the child was listening to the teacher. This first classification was divided into 12 categories and Table 6 gives these categories with the percentages of responses under each, for both groups of children. "Body movements" as wiggling back and forth in their seats, scratching or manipulating parts of the body, had the largest percentages, for, among the problem children, 26.1 per cent, and among the average children, 25.0 per cent of all the responses in the first classification were of this sort. "Mouth responses" were next in order of percentages reported for both groups. A response here was interpreted to be the insertion of the thumb or finger in the mouth, the protruding of the tongue, the biting of the lips or fingers. The average children had the larger percentage, 18.3 per cent, than that reported for the problem group

TABLE 6

CLASSIFICATION I

Relative Percentages of Responses Involving Self for Both Groups of Children.

	Problem %	Average %
Facial responses	8.6	9.2
Mouth responses	16.6	18.3
Head responses	10.6	15.5
Nasal responses	1.8	4.1
Body movements	26.1	25.0
Hand movements	7.0	5.2
Locomotion (permissible)	4.3	3.3
Locomotion (without permission)	1.4	0.5
Vocal responses	5.9	3.2
No overt reaction	2.7	3.3
Standing up in seat	7.7	6.6
Sitting down in seat	7.3	5.8
	100.0	100.0

which was 16.6 per cent. "Head movements" were third for both groups, and here again the average children exceeded the problem group, the percentages being 15.5 and 10.6 per cent respectively. These included pulling or twisting the hair, scratching their ears, nodding their heads.

Only once, during the total of 595 classroom observations made on these children, did a teacher speak to a child about any of the responses discussed above. One teacher told her problem child to take his finger out of his mouth. This was during the course of a period when he was reciting.

With the exception of the category marked "no overt reaction," which indicated a completely passive attitude, so far as the investigator could determine, and "locomotion," as walking in the classroom for which the teacher's permission had been given, the categories in this classification were those involving activity very likely to attract the attention of the teacher. "Vocal responses" included whistling to oneself, humming to oneself, or talking to oneself. These were 5.9 per cent for the problem children, and 3.2 per cent for the average. The problem children moved about without permission three times as much as did the average children, according to the recorded percentages. As was indicated in the description of the categories, the last two categories were grouped separately from the other body movements because of the different reactions that teachers made to them. When these two were combined, more than one-seventh of all the responses that were included in this classification for problem children and one-eighth of all those for the average children are given as "standing up and sitting down" in their seats. These were movements, probably not sanctioned by schoolroom procedure, unless for purposes of recitation, which did not figure in this classification. In the separate analysis of the categories of this classification, there were no significant differences between the percentages of responses for the two groups. Each group, apparently, manifested almost as much interest in self as did the other group.

3. *Analysis of Observed Responses Involving Things.*

Grouped under the second classification, Responses Involving Things, were many of the categories in which the work of the school was included. Table 7 shows the categories and the percentages of responses. The various forms of manipulation were put into

TABLE 7

CLASSIFICATION II

Relative Percentage of Responses Involving Things for Both Groups of Children.

	Problem %	Average %
Manipulation of pencils, books	16.5	16.7
Other forms of manipulation	12.3	6.8
Looks at objects in room	6.5	8.9
Looks at blackboard	5.9	7.2
Looks out of window	1.8	2.2
Writes or draws as part of work	23.1	20.3
Looks at book for reading, etc.	16.5	20.2
Turns pages while reading	2.3	3.6
Looks at papers on desk	7.8	8.0
Puts things into his mouth	6.1	5.7
Drops things on the floor	1.2	0.4
	100.0	100.0

separate categories to increase ease of analysis. In the manipulation of pencils, paper, books, and other materials for the work of the school, there is a negligible difference between the groups, for 16.5 per cent of such responses were reported for problem children and 16.7 per cent for the average children. Of the responses involving the manipulation of things that did not have a direct bearing on class work, 12.3 per cent in the problem group and 6.8 per cent in the average group, were reported. This included playing with things that were either brought into the schoolroom or found by the children on the floor. In responses that involved a passive observation of things, as looking at objects in the room or looking out of the window, the average group had larger percentages that did the problem group. Combining the percentages for both types of responses, the result was 8.3 per cent for the problem children and 11.1 per cent for the average. The problem group "put things in their mouths" oftener than did the average children, for 6.1 per cent of the responses of the problem, and 5.7 per cent of those for the average group were so classified. The problem group dropped three times as many things on the floor as did the average group, according to the 1.2 per cent reported for the problem children and 0.4 per cent reported for the average group. The remaining five categories in this classification concerned more closely the work of the classroom. These categories were 4, 6, 7, 8, 9, in this classification. Of the responses manifested by the problem group 55.6 per cent were in the categories given above, and 59.3 per cent of the responses classified for the average children were in the same categories. In summarizing, there was an appreciable difference, but not a statistically significant one, in the percentages of the responses made by the two groups to the classroom work although nothing can be said concerning the quality of these responses.

4. *Analysis of Observed Responses Involving Other Children.*

The results of the analysis of Classification III, which concerned responses involving other children, are presented in Table 8. The largest percentages reported for both groups of children is that of "observation of other children." This included looking at other children or watching them, and 37.8 per cent of the problem children's relations with other children in the classroom took this form of expression, while 48.3 per cent of the average children's responses were of the same type. This was the largest percentage difference reported in the classification, but had no statistical significance. The amount of talking without permission between the two groups differed, for 34.7 per cent of the problem children's responses were in this category and 29.8 per cent of the average children's responses were so classified. There was little difference, however, in the percentages of responses reported for both groups

TABLE 8

CLASSIFICATION III

Relative Percentages of Responses Involving Other Children for Both Groups of Children.

	Problem %	Average %
Observation of other children	37.8	48.3
Talks under breath to a child	34.7	29.8
Is talked to	10.9	9.6
Smiles at other children	4.1	6.3
Looks at other child's work	5.5	2.7
Contacts, as pushing, etc.	5.0	2.5
Takes things away from child	1.2	0.4
Accidental contacts	0.8	0.4
	100.0	100.0

when either problem child or average child was "being talked to" by another child. "Looking at another child's work," either to get an answer from it or for purposes of comparison, accounted for 5.5 per cent of the problem children's reactions and 2.7 per cent of the average children's responses. Contacts with other children, as punching and tripping; accidental contacts, as bumping another child; and taking things away from another child accounted for 7.0 per cent of the problem children's responses and for 3.3 per cent of those manifested by the average group. As shown by these last three categories, the percentages of responses that might be considered as giving trouble to the teacher were twice as great for the problem children as for the average group. The analysis of the categories in the classification on a percentage basis brought out no significant differences between the two groups, but based on the analysis made, the problem children did respond to other children in the classroom in a more aggressive, annoying, and disturbing way than did the average children.

5. *Analysis of Observed Responses Involving Teacher and Other Adults.*

Table 9 shows the relative percentages in Classification IV of responses for both groups involving the teacher and other adults. The average children showed more reactions of a passive nature to the teacher than did the problem group, for 28.7 per cent of the responses made by the problem group and 40.0 per cent of those made by the average group consisted of looking at the teacher. The interest of both groups in adults other than the teacher was practically the same, for the problem children made 3.1 per cent of such responses and the average group, 3.3 per cent. Categories 3, 4, 5, 6 in this classification dealt with the child's relations to the teacher in matters of school work. There was almost no percentage difference between the two groups when the percentages of these categories were combined, for 9.9 per cent of the responses for the problem children and 9.8 per cent of the average children's responses were of this sort. Categories 7, 8, 9, 13 were those dealing with the teacher's relations to the problem and average groups concerning the work of the class, and her relations to the groups of which these children were members. Among the problem group, 28.9 per cent

TABLE 9

CLASSIFICATION IV

Relative Percentages of Responses Involving Teacher and Other Adults For Both Groups of Children.

	Problem %	Average %
Looks at teacher	28.7	40.9
Looks at other adults	5.9	1.8
Answers teacher's questions	3.1	3.3
Asks questions of teacher	3.7	3.5
Smiles at teacher	1.0	0.8
Shows work to teacher	2.1	2.2
Teacher gives directions to him about work	6.5	6.7
Teacher gives directions to group about work	14.2	18.9
Teacher talks to him	7.4	7.3
Teacher gives command to him about behavior	14.2	4.5
Teacher gives command to group about behavior	1.3	1.8
He obeys group command	0.6	1.3
Teacher praises his work	0.8	0.6
Teacher looks at him as behavior restraint	8.1	5.5
Teacher touches him as behavior restraint	2.4	0.9
	100.0	100.0

of their reactions, and among the average, 33.5 per cent of their relations center in teacher and work relationships. The statistical differences between the two groups in the percentages reported for any one of these categories mentioned above is insignificant. There was a difference between the percentages reported for "teacher commands concerning child's behavior," for 14.2 per cent of the reactions made to the problem group were concerning their behavior, while only 4.5 per cent of those made to the average group were for the same thing. An appreciable percentage difference was apparent, also, in the behavior of the two groups where teacher reactions to it were concerned, for 8.1 per cent of the responses for the problem group and 5.5 per cent of those of the average group necessitated the "teacher looking at them as a behavior restraint." In 2.4 per cent of the responses for the problem children in this classification and 0.9 per cent of the average group, the "teacher touched child as a behavior restraint." When the percentages in the various categories in this classification were treated statistically, as were all percentages in the other categories, no significant differences were found.

6. *Differences Between the Two Groups When Comparison is Made By Categories of Observed Behavior.*

The percentage distribution basis which was used in the preceding analysis of the data from the observations failed to discriminate clearly in regard to the frequency and significance of the observed behavior between the two groups of children. In order to make this difference between the two groups more meaningful, the mean number of observed responses in each category per observation during 10 observations was computed for both problem and average groups. The standard deviations of the 10 frequencies for each category for both groups of children and the standard errors of the difference between the means were computed. Table 10 gives the findings. Approximately two in every five of the differences were of statistical significance.[4] Had the sampling been larger or the categories more sharply defined, at least three more differences that appeared as good chance ones would doubtless have indicated significance in further distinguishing the two groups. Reference to the table reveals the fact that the categaries in which the most significant differences were obtained were those in which was found much of the behavior that is annoying to teachers. These differences are real, and had it been possible to analyze the data to bring out interrelations doubtless existing among the data in the categories, these differences would have become real and more significant.

7. *A Percentage Relationship between the Behavior of the Problem Group and that of the Average Group.*

When an analysis was made of the observed behavior for both groups on the percentage basis of problem behavior in relation to average behavior, differences in behavior between the two groups were brought out. Table 11 presents the frequency of response for the two groups in each category and the per cent that the responses of the problem groups were of the average children's responses. Figure 2 is given in order to show more clearly the differences between the two groups in absolute frequency of observed response. Viewed together, Figures 1 and 2 seem to show that problem children differ from average children, not so much in the particular kind of

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[4] Formulas are available in the complete study filed in the Library of Yale University.

TABLE 10

MEANS, STANDARD DEVIATIONS OF MEANS AND STANDARD ERRORS OF DIFFERENCE OF MEANS OF OBSERVED BEHAVIOR OF PROBLEM AND AVERAGE CHILDREN

(Based on Frequency of Response for Each Category)

	Problem		Average		S.E. diff. Mn.	$\frac{\text{Diff. Mns.}}{\text{S.E. diff.}}$
Categories of Observed Behavior	Mn.$_1$	S.D.$_1$	Mn.$_2$	S.D.$_2$	—Mn.$_2$	
facial responses	43.4	7.23	32.6	9.94	3.89	2.78
mouth behavior	83.5	14.73	64.6	12.71	6.15	3.07
head behavior	53.7	19.62	55.0	8.66	6.78	.19
nasal responses	9.3	3.29	14.4	6.86	2.41	2.12
body movements	131.6	22.63	88.2	24.78	10.61	4.09
hand movements	34.8	15.67	18.5	6.30	5.34	3.05
locomotion (permissible)	21.8	7.78	11.8	3.31	2.67	3.75
locomotion (without permission)	7.0	3.66	2.0	1.73	1.28	3.91
vocal responses (humming, etc.)	30.0	5.57	11.3	5.27	2.42	7.73
no overt reaction	13.6	5.75	11.7	4.15	2.24	.85
stands up in seat	38.7	6.37	23.5	5.68	2.70	5.63
sits down in seat	37.1	5.61	20.6	6.14	2.63	6.27
manipulation of pencils, etc.	72.5	14.90	62.3	13.77	6.42	1.59
other forms of manipulation	53.8	16.63	25.3	5.37	5.53	5.15
looks at objects in room	28.8	16.71	33.3	12.78	6.65	.68
looks at blackboard	26.0	8.52	26.7	8.17	3.73	.19
looks out of window	7.8	2.96	8.1	3.62	1.48	.20
writes or draws	101.3	20.17	75.6	15.91	8.12	3.17
looks at book for reading	72.5	21.82	75.0	18.51	9.05	.28
turns pages while reading	10.2	5.08	13.5	7.67	2.91	1.13
looks at papers on desk	34.4	11.83	29.7	10.52	5.01	.94
puts things into mouth	26.8	7.49	21.3	7.35	3.32	1.66
drops things on floor	5.5	2.38	1.8	1.60	.91	4.07
observation of other children	79.6	12.66	77.9	10.46	5.19	.33
talks to other child	73.0	10.29	48.0	7.56	4.04	6.19
is talked to	22.8	4.69	15.5	5.33	2.24	3.26
smiles at other child	8.7	6.13	10.2	3.46	2.23	.67
looks at other child's work	11.6	8.33	4.4	15.62	5.60	1.29
contacts (pushing, etc.)	10.6	3.69	4.0	3.07	1.52	4.34
takes things from other child	*2.5*	*1.80*	*.7*	*1.00*	*.65*	*2.77*
accidental contacts	1.7	1.42	.7	.64	.49	2.04
looks at teacher	76.1	13.15	66.1	7.85	4.84	2.07
looks at other adults	15.9	7.74	3.0	1.26	2.48	5.20
answers teacher's questions	8.3	2.79	5.4	1.69	1.03	1.17
asks question of teacher	10.0	6.91	5.7	2.87	2.37	1.81
smiles at teacher	2.8	3.03	1.3	.78	.99	1.52
shows work to teacher	5.7	3.00	3.6	1.62	1.08	1.94
gives directions to child about work	17.4	8.92	11.0	4.71	3.19	2.01
gives directions to group about work	37.9	9.07	30.9	7.45	3.71	1.89
teacher talks to him	19.9	6.47	11.9	4.16	2.43	3.29
teacher commands him about behavior	37.8	11.69	7.3	3.41	3.85	7.92
teacher commands group about behavior	3.5	2.50	3.0	2.53	1.13	.44
obeys group commands about behavior	1.6	2.11	2.1	2.21	.97	.52
teacher praises work	2.1	1.51	1.0	.89	.55	2.00
teacher looks as behavior restraint	21.5	12.09	9.0	5.29	4.18	2.99
teacher touches as behavior restraint	6.5	3.07	1.5	1.36	1.06	4.72

TABLE II

OBSERVED BEHAVIOR OF PROBLEM AND AVERAGE CHILDREN BASED ON FREQUENCY OF RESPONSE

Categories of Observed Behavior	Frequency		% problem behavior is of average
	P	A	
facial responses	434	326	133.2
mouth behavior	835	646	129.2*
head behavior	537	550	97.7
nasal response	93	144	64.6
body movements	1316	882	149.2*
hand movements	348	185	188.2*
locomotion (permissible)	218	118	184.8*
locomotion (without permission)	70	20	350.0*
vocal responses (humming, etc.)	300	113	265.8*
no overt reaction	136	117	116.2
stands up in seat	387	235	164.7*
sits down in seat	371	206	180.0*
manipulation of pencils, etc.	725	623	116.4*
other forms of manipulation	538	263	212.5*
looks at objects in room	288	333	86.5
looks at blackboard	260	267	97.5
looks out of window	78	81	96.4
writes or draws	1013	756	134.2*
looks at book for reading	725	750	96.7
turns pages while reading	102	135	68.0
looks at papers on desk	344	297	115.9
puts things into mouth	268	213	125.9
drops things on floor	55	18	305.8*
observation of other children	796	779	102.2
talks to other child	730	480	152.1*
is talked to	228	155	147.1*
smiles at other child	87	102	85.4
looks at other child's work	116	44	263.9
contacts (pushing, etc.)	106	40	265.0*
takes things from other child	25	7	357.1
accidental contacts	17	7	243.0
looks at teacher	761	661	115.2
looks at other adults	159	30	530.0*
answers teacher's questions	83	54	153.8
asks question of teacher	100	57	175.5
smiles at teacher	28	13	215.5
shows work to teacher	57	36	158.4
teacher gives direction to child about work	174	110	156.0
teacher gives direction to group about work	379	309	122.8
teacher talks to him	199	119	166.2*
teacher commands him about behavior	378	73	518.0*
teacher commands group about behavior	35	30	116.8
obeys group commands about behavior	16	21	76.2
teacher praises work	21	10	210.0
teacher looks as behavior restraint	215	90	249.0
teacher touches as behavior restraint	65	15	433.0*

*Indicates differences which were significant.

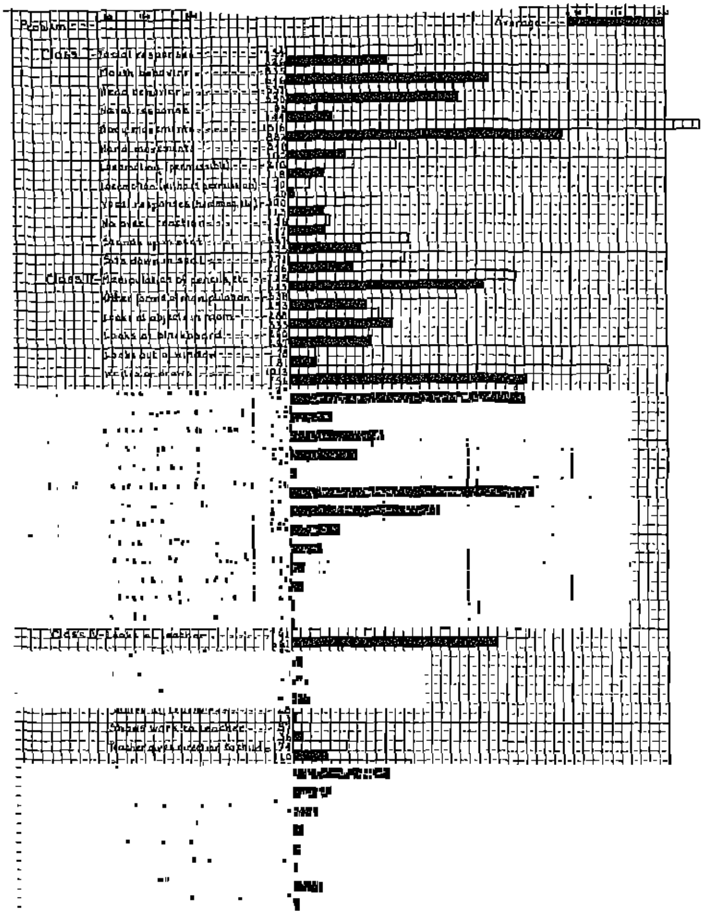

FIGURE 2

Observed Behavior of Problem and Average Groups
Based on frequencies of response.

thing they do, as in the fact that they are generally more active. No effort was made to interpret all of these, but it is well to point out some clearcut differences between the two groups. The first interpretation will be of those categories in which the average children exceeded the problems as shown by frequencies of response, and then other selected categories will be interpreted.

In only two categories under the first classification did the number of the responses of the average group outnumber those for the problem children. Those were responses that the children made which involved head and nose. An analysis of the records of the children for these responses showed that the average children twisted and untwisted their hair, scratched their heads, pulled their ears, picked their noses, more often than did the problem children. These are passive responses from the teacher's viewpoint, are harmless in and of themselves, so would not attract the teacher's attention to them. Individual variation was as great here as in some of the other categories. As was pointed out, many of the categories in the second classification involved the work of the school. In relation to the average child, the problem group did less "just looking around," if one judges by the amount reported for looking at objects in the room and for looking out of the window. These, too, were largely passive responses, and it is possible that the problem group concerned themselves more actively with their neighbors. Whatever else they were doing, the problem group did not consult so often the blackboard for work as did the average group as the 97.5 per cent shown on Table 11 would indicate. As judged by the responses in the two categories involving reading, the problem children did less than did the average group, for the percentages of "looking at their book for reading" and "turning the pages during reading" were 96.7 per cent and 68.0 per cent respectively of those for the average children. Only in two other activities did the problem group show less observable activity than did the average group. The problem children smiled at other children only 85.4 per cent as often as did the average children, and obeyed the teacher's command concerning the behavior of the group only 76.2 per cent as often as did the average children. The category "writes or draws as a part of work," takes in a generous part of the day's activity in the schoolroom. The problem group made 1⅓ as many reactions of this sort as did the average children. Care must be exercised to avoid a spurious interpretation of this increased activity of the problem group. An analysis of the observations would indicate that the problem children had a shorter attention span than did the average groups, so wrote at shorter stretches than did the average group. No timing of separate activities was done, so sustained activity might not show such a high frequency. The category of "manipulation of pencils, books, and papers" showed a higher percentage for the problem group that may be misleading. The problem group made $1^{1}/_{0}$ times as many responses of this sort as did the average children. An analysis of the problem children's records brought out the fact that they made many more movements in getting ready to work and played more with their materials than did the average children. The problem children also looked more often at their work than did the average children, if the 115.9 per cent reported was an indication. These last three categories which have been analyzed, showing an increase of problem behavior over the average behavior, indicated, in all probability, a scattering of attention on the part of the problem group and may have given some justification for teachers considering them problems.

8. *A Comparison of Annoying or Non-Acceptable Behavior in the Two Groups.*

No effort was made, either during the recording of the observations or during the analysis of them into categories, to decide the desirability or the undesirability of any of the behavior, but it is un-

TABLE 12

NON-ACCEPTABLE
OBSERVED BEHAVIOR OF PROBLEM AND AVERAGE CHILDREN, BASED ON FREQUENCY OF RESPONSE

Categories of Observed Behavior	Frequency P	Frequency A	% problem behavior is of average
locomotion (without permission)	70	20	350.0*
vocal responses (humming, etc.)	300	113	265.8*
standing up in seat	387	235	164.7*
other forms of manipulation (playing with things)	533	253	212.5*
puts things into mouth	268	213	125.9
drops things on floor	55	18	305.8*
talks to other child	730	480	152.1*
is talked to	228	155	147.1*
looks at other child's work	116	44	263.9
contacts (pushing, etc.)	106	40	265.0*
takes things from other child	25	7	357.1
accidental contacts	17	7	243.0
teacher commands him about behavior	378	73	518.0*
teacher touches as behavior restraint	65	15	433.0*
teacher looks as behavior restraint	215	90	249.0

*Indicates differences which were significant.

doubtedly true that some of the categories did include more specifically than others the behavior that might have been annoying to the teachers. Table 12 shows these categories which, in the investigator's experience with classroom teachers, contained the behavior to which the teachers objected.

This table shows that "leaving one's seat or wandering around the room *without permission*" was recorded 3½ times as often for the problem children as for the average group. There was a close relation between this category and the one listed as "teacher touches child as behavior restraint," which was reported 4⅓ times as often for the problem children as for the average. An analysis of the records showed that when the child was out of his seat without permission the teacher very often took him by the shoulder and put him back in his own seat, with the injunction that he stay there. Vocal responses, such as humming, singing to oneself, are annoying to teachers because they disturb the other children and interfere with the quiet and peace of the classroom. The problem group made more than 2½ times as many responses of this type as did the average children. The problem children dropped more than three times as many things on the floor as did the average group. This, too, is a form of noisy behavior and accounts in part, as shown by the records, for the teacher's reactions towards these forms of behavior. The commands consisted most often of telling the child to put the thing away and to do his work. Teachers gave more than 5 times as many commands to the problem group as they did to the average group, and looked at the problem children as a means of behavior restraint 2½ times as often as they did at the average children. A look from the teacher or a shake of her head was a sufficient deterrent, in most cases, for the average child, while for the problem children a command was necessary. The problem child, too, annoyed the teacher by standing up in his seat, which he did more than 1½ times as often as the average child. This was not so annoying as some other forms of behavior that the children showed, unless the child persisted. In several cases, however, the problem children were out of their seats repeatedly, and their teachers commanded them to sit down. Manipulation of things other than those permitted by school practice was carried on more than twice as much by the problem children as by the average children. As pointed out elsewhere, it consisted largely of playing with things other than school materials.

It seems fair to regard it here as a symptom of restlessness and non-interest in school procedures. To put things into one's mouth was considered another form of manipulation and from the data of the records this classification seemed justifiable. The problem group put things into their mouths 1½ times as often as did the average children. It is of interest to point out here that very few of the children in either group put their pencils often in their mouths.

There were six remaining categories in which there was behavior likely to be annoying to teachers. Three of these concerned the child in his social relations with other children and the other three were physical contacts that he had with other children. The problem group talked to their neighbors 1½ times as often as did the average children, and the former were talked to by other children in almost the same proportion. This last category included talking where the child other than the one being observed was the initiator of the conversation, so the observed child was a passive participant at that time. Looking at another child's work was extremely annoying to teachers because it was done so often with the intention of seeing the answer. The problem child made more than 2½ times as many of these reactions as did the average child. This behavior was doubtless more persistent in some children in both groups than it was with other children. Two problem boys, in particular, seized every opportunity to copy the answers to their work from other children. There were conspicuous differences in frequency between the two groups when physical contacts were compared. The problem groups did more than 2½ times as much punching, pushing, and tripping of other children as did the average children. They took things from other children nearly four times as often as did the average group. These last two named categories were probably among the most annoying forms of behavior to the teacher, for they violated the rules of order and of property in the classroom. The frequency of accidental contacts, as bumping against another child, was low for both groups of children, but the problem group showed more than twice that of the average group in this particular form of contact.

9. *Intelligence as a Factor.*

The subjects selected for study were not chosen so as to hold the *IQ* constant. It was pointed out above that the problem group had a slightly lower average *IQ*, the difference being statistically insignificant. To make sure that the greater activity of the problem group was not merely a result of a difference in *IQ*, a comparison was made for the 20 of the 28 pairs of children which permitted a matching for *IQ*. The problem group still showed greater activity of the sorts noted above, by a difference which was 4.5 times its standard error. Other than this, the data permit no conclusion in regard to the relation between *IQ* and classroom behavior.

The comparisons that have been made throughout are suggestive concerning differences between the observable behavior of problem and average children. Individual variations were very great and obviously the groups studied were too small to make sweeping generalizations. Yet it seems fair to conclude that, as shown by the analyses of the observations, real differences did exist in the way that these two groups of children have adjusted to school. Whether the better adjustment that the average group has made will continue to remain true for them, it is impossible to say.

D. THE SYMPTOM SHEET AS A MEASURE OF CLASSROOM DIFFICULTIES

As was pointed out in the preceding chapter, in every room where the investigator studied a child, the teacher was asked to check her two "worst" children, her two "average" children, and her two "best" children, from the standpoint of classroom difficulties, on a symptom sheet of 41 definite items. She was asked to check these children on the basis of frequency of occurrence and seriousness. Only the findings on the basis of frequency for the 28 problem children studied and for the 28 average children are reported in this study. All children in both groups were checked by their teachers on every item of the symptom sheet.

1. *Analysis and Interpretation of the Symptom Sheet.*

In order to present the data from the symptom sheet in a more comprehensive way, an arbitrary scheme of weighting the different frequencies was used. "Never" was weighted 1; "seldom" was weighted 2; "often" was weighted 3; and "always" was weighted 4. A "weighted average" based on the number of children checked on each item was then obtained. The differences between the groups are shown in Table 13, in order of size, from the largest to the smallest. Table

TABLE 15
Summary of Items Checked on Symptom Sheet

Frequency

Behavior difficulty	Problem never	Problem seldom	Problem often	Problem always	Average never	Average seldom	Average often	Average always	Wt. P.	Avg. A.
lack of interest in school	1	5	14	8	20	7	1		3.4	1.3
acts silly, "smart"	1	5	18	4	16	10	2		2.9	0.9
attracts attention of others		4	17	7	13	12	3		3.1	1.2
quarrelsome		4	16	8	20	6	2		3.1	1.4
meddlesome		1	23	4	20	2	6		3.1	1.5
resents correction	5	4	16	3	18	7	1	2	2.9	1.4
blames others for acts		3	18	7	18	3	7		3.1	1.6
sulky	6	7	13	2	16	8	4		2.5	1.0
takes other child's things	4	8	11	5	22	5	1		2.6	1.2
no responsibility for doing work	5	6	12	5	23	5			2.6	1.2
bullies other children	5	5	16	2	24	4			2.5	1.1
tries to show off	3	3	18	4	20	5	3		2.8	1.4
nervous	7	5	9	7	15	5	8		2.6	1.2
disorderly	3	3	18	4	17	7	4		2.8	1.5
ignores teachers commands	1	3	20	4	18	7	3		2.8	1.5
slow in obeying		2	17	9	7	11	10		3.3	2.1
disobedient		4	16	8	12	8	8		3.1	1.9
talks back	6	3	17	2	22	3	3		2.5	1.3
impertinent to teacher	8	4	16		23	5			2.3	1.1
noisy	5	2	18	3	19	5	4		2.7	1.5
annoys other children		2	22	4	17	8	3		3.1	1.9
stubborn	5	3	18	2	20	4	4		2.6	1.4
cheats, copies	3	15	10		24	4			2.2	1.1
tells lies	2	15	8	3	22	4	2		2.4	1.3
restless		2	18	8	12	8	8		3.0	1.9
lazy (physically)	5	3	12	8	16	4	8		2.8	1.7
careless about work	4	2	16	6	14	6	8		2.9	1.8
destructive of materials	4	15	8	1	21	7			2.2	1.2
giggles, laughs out loud	5	6	15	2	15	11	2		2.5	1.5
sneaky, sly	6	4	12	6	16	8	4		2.6	1.6
steals	11	9	8		28				1.9	1.0
talks without permission	1		22	5	7	8	13		3.1	2.2
inattentive		2	18	8	8	9	11		3.0	2.1
tattles	6	6	16		18	7	3		2.4	1.5
teases other children	5	8	14	1	16	9	3		2.4	1.5
untidy about person	8	9	7	4	19	6	3		2.3	1.4
day-dreams	5	9	9	5	17	5	6		2.5	1.6
shows temper at reprimand	9	6	8	5	21	2	3	2	2.3	1.4
whispering			24	4	3	8	17		3.1	2.5
cries easily	13	3	9	1	25		3		1.8	1.2

14 shows the statistically significant differences for the four categories "never, seldom, often and always." The differences constitute statistical evidence of a difference in the reputation of the two groups

TABLE 14

SIGNIFICANT DIFFERENCES IN SYMPTOM SHEET FREQUENCIES

	Frequency			
Behavior difficulty	never	seldom	often	always
	*C.R.**	*C.R.**	*C.R.**	*C.R.**
lack of interest in school	7.13		4.55	3.37
acts silly, "smart"	5.25		5.59	
attracts attention of others	4.89		4.55	3.05
quarrelsome	8.26		4.76	3.37
meddlesome	8.26		5.75	
resents correction	3.97		5.25	
blames others for acts	7.03		3.20	3.05
sulky				
takes other child's things	6.44		3.47	
no responsibility for doing work	6.21		4.57	
bullies other children	6.94		6.06	
tries to show off	5.77		4.91	
nervous				3.05
disorderly	4.55		4.46	
ignores teacher's commands	6.12		5.77	
slow in obeying	3.05	3.08		3.64
disobedient	4.57			3.37
talks back	5.32		4.55	
impertinent to teacher	4.69		6.06	
noisy	4.39		4.46	
annoys other children	6.63		7.01	
stubborn	4.69		4.46	
cheats, copies	8.52	3.48	3.96	
tells lies	7.91	3.48		
restless	4.57			3.37
lazy (physically)	3.28			3.37
careless about work	3.56			
destructive of materials	5.81		3.37	
giggles, laughs out loud	3.03		4.43	
sneaky, sly				
steals	6.63	3.64	3.37	
talks without permission		3.37		
inattentive	3.37			3.37
tattles	3.61		4.14	
teases other children	3.28		3.51	
untidy about person	3.17			
day-dreams	3.68			
shows temper at reprimand	3.58			
whispering		3.37		
cries easily	3.87			

*Critical ratio.

of children with their teachers on the items given on the symptom sheet, and all of the differences were consistent in attributing more undesirable behavior to the problem group.

The "spread" for the groups on the symptom sheet was very narrow, and it gives rise to the speculation that, since the teacher marked her average problem children at the same time, a halo effect may have been a factor in the case.

E. INFORMAL TEACHER INTERVIEW

In an informal interview with the teacher of each problem child, the investigator hopes to get information concerning the attitude of the teacher toward her problem children. At all times, the teachers were willing to talk with the investigator about their problems and they were especially anxious to talk about the children who presented behavior problems. The questions used and the answers given by the teachers are reported here in order that the reader may be able to interpret the answer in the light of the question. The first three questions were, very obviously, "buffer" questions and served no specific purpose, so the answers are not given.

Teacher Interview

1. You have more boys than girls, don't you?
2. Which do you like to teach the better?
3. Do you think that groups of children differ any from year to year in classroom behavior?
4. Do they differ in specific things?

Answer: All but three of the teachers agreed that the children differed in specific things.

5. What is the most common difficulty of the group that you have now?

Answers:

noisy
no interest
restless
lack of application
laziness
can't keep them still
slow in getting to work
no co-operation
low in intelligence
expect to be able to do what they want to do
too much "progressive" education
have too many to take care of their individual problems
dull group
"smart-alecky" group
want to talk out constantly
want to move about constantly
want to mind everybody's business but their own

since you can't do anything but talk to them, they think they can do anything
can't settle down
all of them want to do different things

6. Do you believe that the behavior of a few children influences this whole group?
Answers: one-half of the teachers said "Yes".
one-half of the teachers said "No".
7. Did you know —(Name of child)—before he came to your room?
Answers: known to teacher—12 children
not known to the teacher—12 children
heard of from other teachers—4 children
8. *Did he have the same difficulties in his grade last year?*
Answers: had same difficulties—16 children
didn't know about them—11 children
no trouble the previous year—1 child
9. Can you make any sort of an appeal to him (or her)?
Answers: no appeal—16 children
talks to her—1 child
praise them—5 children
single out for attention—3 children
let him read and do nothing else—1 child
"let him be the whole show"—1 child
10. Are there days when he is better than on other days?
Answers: better on some days than on other—9 children
(one teacher said her problem child was affected by the weather)
the same all the time—19 children
11. To what do you attribute this uneveness of behavior?
Answers: "Born that way"—11 children
home conditions—7 children
no explanation given—10 children

If a summarizing statement can be made for the answers given by the teachers, it must be that most of them feel that their problem children are individualists for whom they can do little because of factors that they believe to be outside their power to remedy.

VI. ILLUSTRATIVE CASES IN BOTH PROBLEM AND AVERAGE GROUPS

The analysis thus far has been of the behavior of the two groups of children who were used in the classroom observation phase of the study. It is the purpose of this chapter to present, in a brief form, the data from four cases as illustrative of the material collected during this phase of the investigation. While these four cases were selected arbitrarily by the investigator, it is believed that they represent as typical cases as could be picked from the two groups. It is hardly necessary to state that all names used are fictitious, and that other minor changes have been made to conceal the identity of the four boys used as representative cases. The facts given, however, were gathered by the investigator in the study of these four children—two problem and two average. The information on the problem boys was more extensive than that available for the average boys, so these former cases are given first.

WALLACE—Chronological Age 9.1.
Grade 4 B.
Mental Age 9.10.
Intelligence Quotient 108.

Wallace was new to the school this year, but his teacher, after a half-year's acquaintance with him, reported him as "wilfully disobedient, sulky, lazy, untidy, doing careless work, and constantly annoying and teasing other children." On the week's record kept by his teacher of her disciplinary troubles, his name appeared twice. He teased and annoyed his neighbors and did not finish work that had been assigned. Her records of him on the Conduct Record Blank and on both forms of the Check-list gave added force to her original characterization, for he was described as "unreliable, untrustworthy, a liar, uncooperative, cowardly, shirked his work, was disorderly in any situation in which she had observed him." On the symptom sheet one-half of the items for Wallace were checked under the frequency marked "always." In general, these were the same characteristics that have been indicated above, and bore out his reputation for disorderly, anti-social conduct. In response to the investigator's questions during the interview, his teacher said that she could make no appeal to him and that she could not shame him. Apparently he did not care about anything. Home conditions were blamed by the teacher. As far as his school work was concerned, she thought that she might as well promote him, since he could do nothing in any grade and might as well be in one as in another. This opinion was borne out by the visiting teacher, who informed the investigator that the boy was very dull and probably would not go far in school.

Classroom observations made on this child brought out behavior which, from the teacher's point of view, would make him a problem. He punched and disturbed other children; he talked constantly without permission, never finished his work and was scolded for it by his teacher. When he took his work to her, she often had to remind him that it was carelessly done. He wandered around the room without permission and on many occasions his teacher sent him to his seat, telling him to get to work. She threatened to change his seat if his behavior did not improve. He manifested nervous movements constantly; his finger or his thumb was seldom out of his mouth; he bit his finger nails repeatedly; often wiggled his body; would put his arms into position for a prize-fight and exhibit his muscle to the children around him.

The test situation found this child shy and extremely self-conscious at the beginning, but he responded quickly to praise and always wanted to know whether he had met with success. At the twelve year level Wallace had a superior plan for finding the baseball, and scored, also, on the fables. The first question on the problem-of-fact test was answered correctly; all other tests at this level he failed. The mental age and intelligence quotient of this child are given at the beginning of the report on his case.

In response to the investigator's questions concerning his school, Wallace replied that he "liked school sometimes and his teacher part of the time." Then he told that he wanted to be a prize-fighter, and how that morning, on his way to school, he had had a fight with another boy.

As was pointed out earlier, the school blamed the home for his lack of interest and for his behavior difficulties. Wallace was one of four children in a home where, according to the school authorities, the mother accepted little responsibility for the training of the children and the father, who worked in an industrial plant, was gone all day. The child was allowed to go with older boys and to come home at any hour of the night that he wished.

GORDON—Chronological Age 7.5.
Grade 2 B.
Mental Age 8.0.
Intelligence Quotient 108.

Gordon was "a thorn in her side," according to his second grade teacher. She reported him on her first schedule as "talking constantly without permission," jumping around, thereby creating a commotion," "bold," "conceited," and "always wanting the floor." Her second schedule, of disciplinary troubles over a specified week, listed him once for "disorder and noisy conduct." According to the Conduct Record and Check-list ratings given him by his teacher, he was "uncooperative, unreliable, dull, selfish, disobedient, and inconsiderate." He was fidgety, noisy, and constantly moving; he tired quickly of a job and wanted to do something else; and he showed no restraint in talking, for he talked constantly unless he was checked. All in all, Gordon was a general nuisance. While only three items were checked under the heading of "always" on the frequency of the symptom sheet, fully two-thirds of the behavior difficulties were reported by the teacher as occurring "often" with him. It was a discouraged teacher who replied to the questions of the interview, for she reported that Gordon was getting worse and more obstinate, and that all his teachers had experienced trouble with him. This fact was later corroborated in conversation with both his kindergarten and his first grade teacher. There seemed to be no appeal to which he would respond. His teacher felt that the mother was to blame for the child's difficulties, because the mother "thinks he can do no harm and that all he does is right and nearly perfect." His teacher reported that he would probably repeat the grade, for he had done nothing up to the mid-year.

The observations made on Gordon in the classroom would, from the teacher's viewpoint, make Gordon a problem, for he constantly manifested behavior that was upsetting to the order and quiet of the room and extremely annoying in its persistence. He disturbed other children by talking to them; he never really settled down to work, a fact which made it necessary for the teacher to speak to him constantly about his behavior. He repeatedly insisted that his work was done when it had not been completed, and he persisted in "showing off." He often manipulated parts of his body, wiggled his legs almost constantly when he was at his seat; kept a finger in his mouth or nose practically all the time, and frequently rocked back and forth on his chair.

As soon as Gordon entered and before the investigator began the psychological examination, he began to tell what he could do. Throughout the examination he maintained this individualistic and egotistical manner, saying constantly, "That's easy." He excused all his shortcomings by saying, "Oh, I didn't understand you." He never waited for an explanation, but always started to answer before the examiner had finished the directions. He passed successfully only the date at the nine year level, and only the drawing of the designs from memory at the ten year level. His mental age and intelligence quotient are given at the beginning of the report.

"Sure, I like school and everything in school. I like the kids, too," was Gordon's answer to the investigator's questions concerning his attitude toward school.

Gordon is one of two brothers in a decidedly superior home, from the economic standpoint, for the father is a manufacturer. The mother is very much interested in the boy, but, according to the principal, says that the teacher does not understand him, while the teacher insists that obedience is not taught at home, so the school can do very little.

CARL—Chronological Age 10.10.
Grade 5 A
Mental Age 12.7.
Intelligance Quotient 116.

His fifth grade teacher called him average in intelligence, in age, and in conduct, for his grade. She said that he was reliable and dependable. Nearly 80 per cent of the behavior difficulties given on the symptom sheet were checked under the frequency of "never" for this child. The only ones that were said to occur "often" were "inattention," "restlessness," and "carelessness about his work."

The observation records made on Carl are singularly free from any sort of conflict with authority, for, during the times that he whispered or talked to a classmate, a look from the teacher was a reprimand sufficient to make him return to his work. At other times he seemed content to look at his neighbors or the children around him, without making any effort to communicate with them. His periods of what the teacher termed inattention seemed to center around the manipulation of something that interested him. Yet he was always aware of what was going on in the recitation, for he was able to answer when called on. As he worked, he twisted his hair into little spirals, then untwisted it.

The test situation interested him. He was very cooperative and after each response he gave the examiner a direct, inquiring smile. At the average adult level he passed only the test involving the repetition of six digits backwards. His mental age and intelligence quotient are given at the beginning of the report. He responded to the investigator's questions without any diffidence. He liked school, his teacher, and all the other children. Reading was his favorite subject, stories of war and adventure being most interesting. Baseball was his favorite game. When asked what he would like to be when he grew up, he answered without any hesitancy, "electrician."

Carl is one of six children. His father is a mechanic in an industrial establishment.

ALBERT—Chronological Age 7.10.
Grade 2 B.
Mental Age 7.8.
Intelligence Quotient 98.

Albert was characterized as average in age, intelligence, and conduct, for the second grade, although he was in the "*B*" division of the grade. With the exception of "whispering" and talking without permission," which was reported as happening "seldom," the symptom sheet filled out by his teacher classified every other difficulty on the sheet as "never" for him.

An analysis of the classroom observations made on this child reveals no conduct to which the teacher might object. A few times that he whispered to his neighbors, the teacher shook her head and he went back to work.

During the psychological examination he was very calm and tried hard to get his responses correct. He took time to reply, and seemed to be mustering his forces for the right answers. His reaction to praise was a very favorable one. He failed all tests beyond the eight year level. His mental age and intelligence quotient are given at the beginning of the report. He said that of all things that he did in school he liked best to draw. Albert liked school, his teacher, and all the children except one boy. When asked why he didn't like this boy, he replied, "He's too fresh." The examiner asked what he meant by "fresh" and he answered "He pushed another boy down."

The father is an executive for a business concern. Albert has no brothers nor sisters, but, as he said, "I have three turtles, an alligator, and a cat."

VII. CONCLUSIONS

1. The first phase of this study, namely, a city-wide investigation of behavior problems of elementary school children as seen by their principals and teachers, has been summarized in III. Its results serve, in the main, to verify the work of other investigators in this field. It corroborates the findings of Haggerty, Wickman and Yourman that the "attacking forms of behavior" (disobedience, defiance, stealing, lying, sex offences) constituted problems for the teachers and were for them the most serious. These modes of behavior interfere with the smooth running of the school and frustrate the teacher's authority.

2. The main conclusions from the second phase of the study in which a group of children designated as problems by their teachers were compared with a group of children in the same classrooms described by their teachers as average in behavior, may be summarized as follows:

a. Between the two groups of children selected for the classroom observation study—28 problem children, and 28 children chosen by their teachers as being average in behavior, there was not a statistically reliable difference in intelligence quotients. Misgrading for life-age was twice as great for the problem group as for the average group; while misgrading for mental age was twice as great as in the problem group. Ten children (five in each group) had repeated a grade, and seven of the ten had repeated the first grade.

b. A total of 595 observations, each 15 minutes in length, were made. Only one child was observed at a time, and at different hours of the school day. Each child had a minimum of 150 minutes of direct classroom observation.

c. The data from the observations were classified into 46 categories designed to be mutually exclusive. The method of analysis was to count the occurrence of the observed behavior responses. A comparison of the observed behavior of the two groups on a percentage basis in relation to the total observed behavior showed no statistically significant differences between the two groups. A relationship between the frequency of response for the two groups, based on the ratio of the problem children's responses to those of the average children showed striking differences, with the percentages of frequency much higher for the problem children. A comparison of absolute frequencies for both groups showed much greater frequencies for the problem children. When a comparison was made of certain categories containing behavior to which the teachers objected, there were striking differences between the two groups, with the higher percentages for the problem group. These categories contained behavior which, from the standpoint of the teacher, was annoying, and upset the order and peace of the classroom, and interfered with the other children.

d. A comparison was made for the 20 of the 28 pairs which permitted a matching for *IQ*. The problem group showed greater activity by a difference which was 4.5 its standard error. Other than this, these data permit no conclusion in regard to the relation between *IQ* and classroom behavior.

e. The symptom sheet of definite classroom difficulties showed pronounced statistical differences in the direction of the problem group when separate columns of frequency were compared for both groups of children.

f. The results of an informal teacher interview, designed to reveal attitude toward problem children indicated that in the opinion of these teachers the difficulties of their problem children were due to home or to innate factors.

A measure of reliability of the observation records was secured by correlating the odd-even observations; for the halves, both groups combined, the correlation was .72 with a *PE* of .04; for the average group .76 with a *PE* of .05; for the problem group .41 with a *PE* of .11. With the use of the Spearman-Brown Prophecy Formula, the reliability coefficients became .84, .86 and .58 respectively. From an analysis of the records, the investigator believes that the factor of inconstancy of problem behavior accounts to a large extent for the difference between the reliability coefficients for the two groups.

The method of direct classroom observation used in the second phase of this study offers possibilities for further investigation, for, by a refinement and redefinition of the categories, individual variations in behavior and interrelations in behavior might be brought out much more conclusively, and a more significantly reliable body of data would doubtless result. The time factor should be given more consideration in studies of this type, for there should be some recognition of the duration of prolonged activity.

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GRAPHIC REPRESENTATION OF A MAN BY FOUR-YEAR-OLD CHILDREN IN NINE PRESCRIBED DRAWING SITUATIONS*

Part of a dissertation presented to the Faculty of the Graduate School of
Yale University in candidacy for the degree of Doctor of Philosophy
1936

PEARL FARWELL GRIDLEY

Clinic of Child Development, Yale University

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PEARL FARWELL GRIDLEY

425 GROVE STREET
EVANSTON, ILLINOIS

I. INTRODUCTION AND STATEMENT OF PROBLEM

In the study of the development of any behavior category, periods of transition are of especial interest, periods in which a given behavior pattern takes on new significance in relation to a larger pattern. In children's drawings of a man it is normally near four years of age that the configuration of pencil marks on paper first assumes to adult eyes a vague resemblance to the object. The early dominance of the motor component is giving way to the perceptual. The child has begun to point out chance similarities between his pencil marks and a familiar object, to attempt to shape his graphic forms to resemble this object, to criticize his drawing in terms of his success or failure in portraying it.

Without knowledge of the drawing process the completed graphic pattern may be indistinguishable from the earlier scribblings, but the sequence of its line-by-line construction, the shifting manipulation of both pencil and paper, and especially the accompanying verbal comments, show clearly a nascent recognition of the representative function of drawing and a bewildering complexity and variability of behavior in the child's exploration of the newly recognized potentialities in the paper and pencil situation.

The total observable behavior which accompanies the graphic patterns in this period of beginnings has received little attention. Even less study has been accorded the setting of these patterns in relation to fine motor control, visual perception, previous experience with paper and pencil, the degree of mastery of verbal symbols, and the many factors both immediate and remote which condition the child's response to the request to draw a man.

In their normative study of infant behavior Gesell and Thompson have shown how important to an understanding of mental growth is the anticipatory phase of a behavior pattern. Their procedure was designed to reveal "the total tide of behavior rather than eventual success of performance" (9, p. 15), the relation of any behavior item to the antecedent and subsequent phases of the temporal pattern and to the total, momentary pattern of which it is a part. They have charted the sequence of behavior items in the paper and pencil situation within the first year of life. Data for age levels above 56 weeks have not yet been published.

In an earlier report of the preliminary normative investigation Gesell describes two items which refer to the representation of the human figure (6, pp. 88, 374-375). The "man with head and legs" is assigned an *A* rating at 48 months, the "recognizable man" a *B* rating at 60 months.[1] In a later publication the "man with head and legs" is not mentioned and the "recognizable man" is placed between 48 and 60 months of age (7, p. 216). The description of these items permits varying interpretations on the part of examiners as to what constitutes a "recognizable man." Neither the anticipatory phases in this graphic pattern nor its setting in the total observable momentary pattern is described.*

Goodenough's (10) scale for the measurement of intelligence by a single drawing of a man is designed for analysis of the completed graphic pattern without knowledge of the accompanying behavior. The only differentiation made within drawings which to adult eyes bear no resemblance to the human figure is one of degree of motor control. Those which are vaguely representative, but which are less well developed than is Gesell's "recognizable man," are distinguished for the most part by the number of parts of the body drawn. A mental age of 42 months is earned by the differentiation of two parts by forms recognizable to the adult. With few exceptions three months of mental age are added for each additional part. As our data will show, examiners differ widely in the scoring of these nascent representative drawings when knowledge of the drawing process is lacking.

It is only in the biographical studies (2, 15, 16, 23, 5, and others) in which the drawing development of an individual child has been recorded over a period of months or years that the anticipatory and subsequent phases of the first "recognizable" graphic representation of a man have been reported and that an attempt has been made to record the accompanying behavior and interpret the pattern in relation to its total setting.

Luquet argues that the biographical method, in which a continuous record is kept of all spontaneous drawings of the child, is the beginning and end of any psychological analysis of drawing. It sets the problems to be studied by other methods and serves as a check on the validity of results obtained. For an interpretation of any graphic pattern he requires information on the order in which the parts were drawn, "the way in which it was drawn," the child's intention, his personality, interests, and quality of mind, the number of drawings previously made of other objects as well as of the object represented in the graphic pattern under consideration, the behavior just preceding the drawing act, the mental set at the time of drawing, and any conditions both immediate and remote which may limit spontaneity of expression (18, p. 211). Rouma's requirements are similar (23, p. 157). In his discussion of the measurement of intelligence by drawing he states that to judge the individual child's level of development by this means one must secure at least 20 drawings in chronological sequence. The observer must be present during the drawing process, must note all verbal comments and must know the amount of training or practice the child has had. While not essential he considers it of value to observe the way in which the child works and the time consumed.

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[1] An *A* rating signifies that 20 to 49 per cent of his subjects were successful, a *B* rating that 65 to 84 per cent passed the test.

*In the recent publication by Gesell and Thompson, received by the writer after the present report went to press, tentative revised norms are outlined for the pre-school period. The "man with head and legs" is placed at 48 months, a "man with feet" is placed at 60 months, and the "recognizable man" is not mentioned (9*a*, pp. 267-268).

The difficulty of evaluating the completed graphic pattern without knowledge of its line-by-line construction is clearly shown by Brown in his description of the drawing of an elephant by Ruth W. at three years of age. Seven parts of the body were differentiated but the finished product appeared an "indistinguishable jumble" of overlapping parts. "What with the extreme rudeness of the individual features and the complete disorder of their relation, by the time such a drawing was done it was impossible to trace any purpose in it. Had I not seen the process I should certainly have thought these drawings mere scrawls, named by the child purely as symbols" (2, pp. 11-12).

Stern and Stern (25, p. 2) describe a technique of recording the line-by-line construction of a drawing which they occasionally used in the biographical study of their son Gunther. As the child drew on a blackboard the parents stood behind him and made a free-hand copy of the graphic pattern as it developed. They consider this method applicable to the early age levels only as any self-consciousness at being watched destroys the spontaneity of the child.

A cross-sectional study in which the child is presented at stated intervals with a series of prearranged behavior situations facilitates the acquisition of some of the information considered essential by Luquet and Rouma for the interpretation of any drawing. Recurring samples of the anticipatory and subsequent phases of a given graphic pattern may be obtained and specific aspects of the total momentary pattern may be uniformly recorded and analyzed. Rouma (23) discusses the advantages of this method and himself made use of it in combination with his biographical studies. He does not, however, report the details of his procedure. His work, extending over a period of 13 years, is the most comprehensive study to date of children's drawings from the genetic point of view. The method has been developed by Gesell (6) and Gesell and Thompson (9, 9*a*) in the normative survey but, as previously stated, only preliminary data have been reported for age levels above 56 weeks.

The present study has as its setting this normative survey. A group of subjects whose behavior growth has been charted since early infancy was examined by the writer at the four-year level. In the course of the regular four-year developmental examination a series of drawing situations was introduced, designed to explore more thoroughly than has previously been done in this period of nascent representative drawing the graphic patterns of a man obtained under semi-experimental conditions. Analysis of the relationship of these patterns to the early growth history of the subjects and to the current level of development in other fields of behavior is not included in the present report. Our concern is (*a*) an analysis of the degree of uniformity or variability in drawing behavior elicited under varying conditions, uniform for this group of four-year-old children, (*b*) an interpretation of the graphic patterns in the light of the accompanying verbal comments and postural behavior of the child, and (*c*) a description of those aspects of present behavior which foreshadow characteristics of later stages of drawing development described by others.

A review of the literature reveals various and often conflicting statements concerning the child's ability to modify his accustomed mode of representing a man to accord with adult instructions. There is disagreement, too, as to the amount of variability within the spontaneous drawings of an individual when no specific suggestions are given.

The apparent indifference of the young child to the visual appearance of an object and his failure to modify his drawing to accord with a visible model or copy has received the attention of many investigators (22, 26, 20, 21, 2). Goodenough summarizes the findings as follows:

> To the little child, the visual appearance of an object at *any given instant is secondary to the more general facts* which he has learned about it. . . . His drawings of a model placed before him do not differ from his drawings of the same object when no model is present. The model serves no other purpose than that of determining the subject to be drawn, after *which the drawing proceeds according to his concept of the* object and not according to its immediate visual appearance (11, pp. 505-06).

While it is generally agreed that the main features of the drawing are modified but little if at all by the presence of model or copy there is evidence that it may exert a positive effect upon the addition of details. Partridge asked 200 children from 7 to 13 years of age to draw from model a seated woman. Over 90 per cent drew the hat with feathers which she was wearing; many drew her rings and buckle; 50 per cent of the group represented the fact that her hands were clasped in her lap (21, pp. 173-176). In the biographical studies of four children Brown (2, pp. 67-68) records several instances prior to 48 months in which a definite effort is made to reproduce the visual appearance of model or copy and criticize the drawing by reference to it. In summarizing the findings he notes that drawing from copy is easier than from model and that while the latter discourages further attempts the former may give added confidence.

The effect of verbally suggesting parts of the body to be included in the drawing is reported in several studies. Passy (22, p. 615), in order to elicit the representation of facial and head features by a seven-year-old boy, reminded the child of each part in turn, saying, "What does one see with?" "Where are his ears?" These parts, added on request, had appeared in earlier spontaneous drawings. Brown (2, p. 45) reports the case of a child of 43 months who, in response to the examiner's suggestion, added arms and hands to his first drawing of a man, in which head, legs, and facial features had been spontaneously represented.

Baldwin records the efforts of his daughter, between 19 and 27 months of age, to imitate his rough representations of animals and men drawn as the child watched. Prior to 27 months "the 'drawing' was simply the vaguest and most general imitation of the teacher's movements" (1, p. 83). At 27 months a change in procedure was instituted. Baldwin named in turn the various parts of the pictured man as he drew. The child looked intently at the copy and drew in order several parts in graphic forms clearly recognizable to an adult. "The fact was unmistakable that with simplification of the figure by breaking it up into parts had come also the idea of tracery imitation and its imperfect execution" (1, p. 87).

Rouma (23, p. 36) attempted to improve the drawings of several subnormal subjects by presenting them with a model and dictating in succession the parts to be drawn. He secured a temporary enlargement of the formula[2] but no permanent advance. This author also describes a memory drawing, made by a normal boy of 46 months, after discussion and analysis of a scene in a picture showing a child helping his mother carry a basket. "The man is represented in habitual manner but the result of the analysis of the picture is manifested by a profusion of details which the child does not ordinarily draw" (23, p. 97).

Among factors which have been found to influence the child's graphic patterns of a man, size of paper is mentioned by a number of investigators (2, 15, 23). The relative proportion of parts as well as the size of the total drawing may be governed by the size of the sheet. Rouma (23, pp. 76-85) argues that much of the disproportion of parts common in the drawings of young children is the result of a restriction of movement imposed by the barrier of the paper's edge. The drawing is started on a large scale regardless of the size of the sheet and succeeding parts are diminished and contorted in an effort to crowd them into the small remaining space. He finds likewise a wide variability in the relative proportion of parts in successive drawings by the same child when conditions are held constant. Each of two children, six and seven years of age, made a series of four drawings on two successive days. The proportion ratios for the several parts of the body varied greatly. Rouma cites these findings in criticism of the reliability of Schuyten's (24) minute measurements of the relative size of the parts in children's drawings, made in an unsuccessful effort to establish age norms for approximation to classic standards of proportion.

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[2] The term "formula" or "schema" has received various connotations. W. Stern (26, pp. 369-70) defines it as "an optical picture in which a mental idea is represented by 'natural' optical symbols. . . . The stroke in a 'schema' must, therefore, have some likeness, however distant, with the object represented." Krötzsch (quoted by Stern, p. 369) limits the term to a drawing which has become mechanical. "A 'schema' means fixation. Fixation is shown only in the automatic application of the same rhythmical movements." We use the term as synonymous with Luquet's "type," the child's customary mode of representing an object, which changes gradually through the combined influence of maturation and external conditioning factors (16). It implies neither that the graphic forms are of necessity "natural optical symbols" nor that the movements used are automatic and rhythmical. It does imply that the configuration of lines is used as a symbol for the object and is modified but little if at all by the angle from which it is seen or by changes in perspective.

Impressed by the symbolic character of children's drawings and the meager influence of model or copy some writers have stressed the rigidity of the formula, its unvarying character despite specific instructions or change of conditions under which the drawing is made. Passy (22, p. 614) deplores the "lack of sincerity of the little artist," who will not "take the trouble to observe," but mechanically reproduces his memory image of the first drawing made by some adult in his presence. O'Shea states that "the peculiar diagrammatical representation of any object is strikingly characteristic of a child in all of his drawings and any one characteristic that appears in an object in any picture will be shown in all the pictures of that object drawn" (20, p. 1020).

There is some evidence that this tendency toward uniformity is less marked in the nascent period of representative drawing than in those later stages which have received more extensive study. Lukens (15, p. 85) observed in the drawings of Helen S. that conventionalization increased after four years of age. The suggestion of movement and facial expression secured by a few bold strokes at 48 months had been replaced at 62 months by a conventionalized formula. Brown reports an increased simplification and conventionalization in the drawings of Ruth after 52 months of age (2, pp. 32-33). He attributes this to "frequent repetition of the same figure till the easiest way of producing it has been discovered" (2, p. 70).

The biographical studies yield ample evidence of uneven progress in the development of representative drawing. Formulae in the making are fluid and highly variable. There are recurrent periods of flux, high and low points in the representative value of the drawings of an individual child, fleeting anticipations of some characteristic which later becomes a relatively stable part of the graphic symbol for a man.

Luquet has traced the appearance, disappearance, and reappearance of various parts of the body in the drawings of Simonne (16, p. 132).

Arms were first represented at 41 months, were fairly constant during the ensuing month, appeared occasionally thereafter prior to 63 months when they were adopted as a permanent part of the formula. The trunk was drawn occasionally at 45 months, once at 57 months, and invariably after 63 months. A striking lack of uniformity both in the parts of the body represented and in the synthesis of these parts is shown in an example citied by Luquet in which a child of 39 months made eight drawings of a man at a single sitting (17 p. 687 and Figure 9, p. 702). Four are without arms; in three, arms are attached to the head, in one, to the legs. One man is without facial features, one has eyes alone, four have eyes and either mouth or nose, and two have all three features. He attributes this variability to a fluctuation of attention. In any single drawing the child represents but a small number of the characteristics which form a part of his concept of a man. Those parts of the body and those relationships which occur to him at the moment are represented. Attention wanders and the drawing is considered complete (17, p. 691).

In a biographical study of four children between the ages of 27 and 64 months of age Brown comments upon an alternation between attention to detail and attention to general outline:

> . . . the rule seems to be that each considerable advance in realism was attended with increased attention to detail, and with a corresponding detriment to the organic unity of the drawing. With his limited range of attention, the little one does not seem able to accomplish a new differentiation in his figures without some loss of integration; and more perfect integration must be paid for with some corresponding loss of previously acquired differentiation (2, p. 71).

Eng considers this alternation between excellence of general outline and excellence of detail, amply illustrated in the drawings of her niece, to be an instance of what is probably a "psychological law of great generality" found in many behavior patterns (5, p. 24).

Prior to the development of a relatively stable mode of representing the human figure, at the beginning of the fifth year, Eng (5, pp. 9-37) records the appearance and disappearance of several distinct formulae each of which is preceded by a period of scribble. By four years of age the essential parts of the body were usually present but there continued to be high and low points in the general representative value of the drawing and considerable variability in detail. Eng attributes the periods of scribble preceding the appearance of a new formula to intentional practice on the part of the child. Previously unused geometrical forms, dominant in these practice periods, later appeared in the representation of an object. These "industriously repeated and apparently intentional exercises" (5, p. 29) persisted through the eighth year, when the study terminated. They occurred throughout in alternation with well-developed formalized drawing.

These reports from the biographical studies suggest the need for exploring under experimental conditions both the extent of spontaneous variability in the child's graphic patterns and the effect of specific suggestions and varying instructions.

In the present study a group of four-year-old children were requested to draw a man in a series of nine controlled situations, to be detailed below. The conditions imposed made varying demands upon mental and motor development. They were designed to elicit modification of the child's spontaneous graphic patterns in response to various forms of verbal and visual suggestion.

In summary, the purpose of the study is an analysis of the four-year-old child's ability to represent a man in a series of prescribed behavior situations. The study differs from previous ones in the field of children's drawings in the following respects:

(*a*). The choice of a group of subjects exactly four years of age, highly homogeneous as to mental maturity and as to social, economic, and educational background, whose mental development in various fields of behavior has been observed and tested at regular intervals from early infancy.

(*b*). The presentation of a series of controlled situations designed to measure, in this period of nascent representative drawing, the degree of uniformity or variability in drawing behavior and the extent of adaptation to specific instructions and varying conditions.

(*c*). The use of a technique for recording the line-by-line construction of the graphic pattern in the course of the drawing act, which is somewhat more inclusive and more exact than any previously reported.

(*d*). The interpretation of the graphic patterns in the light of accompanying verbal and postural behavior which is uniformly recorded for the group.

(*e*). The setting of the series of drawing situations within a clinical examination which offers a rich background of information on the development of associated behavior patterns.

II. METHOD

A. SUBJECTS

The setting of the study within the normative survey, in progress since 1927 at the Clinic of Child Development of Yale University, has been described above. The experimental group forms a part of the larger normative group, examined at the Clinic at regular intervals since four weeks of age. The data were secured during the course of and supplementary to the regular developmental clinical examinations at the four-year level. These examinations were given on two successive days within a few days of the child's fourth birthday. All data were collected between January and July of 1933.

Twenty-four children from the normative group were available for the study. Five were used in preliminary work to test our method of recording the drawing process and to standardize procedure. Because of illness or emotional disturbance the records of three were considered unreliable and were omitted from the computations. The remaining 16, 11 boys and 5 girls, comprise the experimental group. The normative subjects were carefully selected during infancy

> to constitute a homogeneous group from the standpoint of socio-economic status and educational background of parents and race. The parents of the infants were all born in the United States and their grandparents were of northern European extraction. Only those infants were included whose parents were of middle status with respect to occupation, schooling, avocational interests, home equipment and household furnishings. The fathers' occupations gave ratings from 4.98 to 11.74 based on the Barr Scale of Occupational Intelligence (9, p. 5).

The social and educational background of the experimental group, as judged by the Barr *Scale* ratings and the number of years of schooling of both parents, is given in Table 1.

All children of the experimental group were in good health at four years of age. None had attended nursery school or kindergarten. The average mental age of the subjects, as measured at the four-year examination by means of the Yale Developmental Schedules[3] and the Stanford Binet Tests, is slightly above 48

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[3] Early norms for the pre-school period are given by Gesell (6) and tentative revised norms by Gesell and Thompson (9*a*, pp. 265-268).

TABLE 1

Sex, Chronological Age, and Mental Age of the Subjects, Occupational and Educational Status of the Parents, Time Interval between the Two Sittings at the Four-Year Examination

S	Sex	Mental age of subjects in months					Number days deviation from C.A. of 4 yrs. at first sitting	Number days between sittings	Barr scale rating father's occupation	Number of school grades completed by	
		Yale developmental schedules*				Stanford Binet†					
		L	A	P.S.	Total					Father	Mother
1	M	54	42+	60+	48	50	+10	3	9.72	8	8
2	M	36	48—	42	42	38	0	3	7.02	10	8
3	M	54	48	42—	48+	52	0	3	9.37	6	9
4	M	60	54—	60	54	62	— 4	6	10.26	11	10
5	M	54	48+	42	48+	48	+12	3	10.26	5	7
6	M	48	48	48	48	47	+ 7	3	10.26	8	12
7	F	60	48—	60	48+	46	— 9	5	9.72	10	8
8	F	60	54—	60	54	52	+ 3	2	9.72	10	8
9	F	48+	48—	48	48	54	— 6	3	6.27	9	8
10	M	42	48	48	48—	48	— 9	1	8.08	8	8
11	F	48	48—	60	48	43	+ 1	4	8.89	12	12
12	F	48	48—	42	48—	49	— 4	3	7.02	8	10
13	M	60	48—	48	48	45	+14	6	7.17	8	9
14	M	54	48	42	48	51	+17	6	7.39	11	12
15	M	42	48	42—	42+	46	+15	3	10.26	8	8
16	M	60	48+	42—	48+	44	+12	3	8.75	8	8
Av.					48+	48.4	7.7	3.6	8.76	8.7	9.1

*The mental age by the Yale Developmental Schedules is a clinical estimate on the basis of test items in the fields of language (L), adaptive (A) and personal-social (P.S.) behavior. A plus or minus sign indicates behavior which approximates the norm in question but is slightly superior or inferior to it.

†1916 Revision.

months. The number of days deviation from the chronological age of 48 months at the time of the first sitting and the interval between sittings is shown for each child.

B. PROCEDURE

Prior to the first sitting the examiner called in the home to secure information on health history since the last examination, daily schedule, play interests, play equipment, and certain items of personal-social development. In most cases she made initial acquaintance with the child and awakened his interest in the proposed trip to the Clinic. On the examination days she drove mother and child to and from the Clinic and made further incidental observations on personality and language development.

Examiner and child entered the examining room together. The multiple cubes of the Yale *Developmental Schedules* had been arranged on a low table and the child was encouraged to "Make something with the blocks. Make anything you like." The room was furnished with table, two chairs, a small closed cabinet containing the test materials, and in the far corner a flight of steps, used in observing gross motor activity. An observer and the mother were seated in an adjoining room separated from the examining room by a one-way-vision screen (8, p. 641) which gave an unobstructed view of the child's activities.

The examiner presented the test materials and made brief notations and a stop-watch record of behavior. Spontaneous conversation was encouraged and any questions which did not interfere with the prescribed procedure were answered.

In all drawing situations the paper was placed directly in front of the child, seated at the low table to the examiner's right, and the pencil presented in the midline. Full freedom of movement was permitted during construction of the drawing, provided only that the paper remained flat upon the table-top. No suggestions on technique were given and the child was allowed to rotate the sheet at will, to stand, or to walk around the table and draw from a new angle. If the process were interrupted by irrelevant activity the subject was reminded of the task by repetition of the instructions and was encouraged to continue. After completion of a drawing the examiner pointed out various segments which appeared to be intended as representations of parts of the body and asked the child to name them, saying, "What's that?" "What did you make here?"

The test items were presented in a uniform prearranged order except in occasional instances when co-operation was poor. In this event items such as the Binet colors, weights, coins, or the handedness tests, which appeared neutral in suggestive value for the drawing series, were introduced out of turn in order to reestablish interest.

An observer, behind the one-way-vision screen, recorded verbatim the child's verbal comments and any questions of the examiner not included in the routine procedure. In the drawing situations she copied the graphic pattern line by line as it developed, recording sequence of line by number and direction by arrow. Near the margin of the copy sheet the child's comments and naming of the parts were recorded. The moment of their occurrence was shown by a number corresponding to the number of the line under construction when the comment occurred. The symbol *Q* preceding a notation indicated that the comment occurred in response to the examiner's request to name a given segment of the drawing.

If the child altered the original orientation of the paper to himself either by rotation of the sheet or by walking around the table, the observer rotated her copy sheet to correspond, indicating by letter the side which formed the top, i.e., the portion farthest from the child, at the moment of drawing each line. At the end of each sitting the examiner and the observer combined their records and added notations of a general nature on emotional tone and degree of cooperation. The child's drawings were then compared with the observer's copies and with the help of notations on the latter arrows and numbers were placed on the originals.[4]

The copies, often made of necessity at high speed, were poor reproductions, but were adequate to transfer the desired information to the originals. The observer's record sheet was especially useful in reconstructing a drawing which the child had terminated with an effacing scribble. If the drawing process moved slowly the observer added detailed notations on grasp of pencil and occasionally made diagrams in illustration.

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[4] The writer is indebted to Dr. Frances Ilg both for development of the recording technique and for her skilled service as observer, and to Miss Glenna Bullis, who substituted for Dr. Ilg in the latter part of the experiment.

Apart from stop-watch notations no writing was required of the examiner. She was able to foster the natural play aspect of the drawing situations and participate in the "game," within the limits of the prescribed conditions. This favored spontaneous behavior on the part of the child and increased cooperation. Though the observer was seated less than three feet from the subject her presence was detected in only a few instances and then elicited no more than a casual glance or query.

C. ORDER OF TEST ITEMS

The drawing situations were interspersed among other test items in a sequence designed to secure maximum cooperation and to minimize perseveration and transfer effects.

1. *First Sitting.*
    1. Mutiple cubes (6, pp. 109-11).
        - *a*) Spontaneous block building.
        - *b*) Block bridge.
        - *c*) Block gate.
        - *d*) Block stairway.
    2. Spontaneous drawing.
       Instructions: "Draw something for me. Draw anything you like."
    3. Drawing Situation 1.
    4. Drawing Situation 2.
    5. Drawing Situation 3.
    6. Copying geometrical forms (6, p. 85).
       Three trials are given with each form.
        - *a*) Circle.
        - *b*) Cross.
        - *c*) Square.
        - *d*) Triangle.
        - *e*) Diamond.
    7. Gesell man completion drawing (6, p. 130).
    8. Man completion series.
       Twenty-one incomplete drawings of a man in mimeographed form are presented singly in sequence. These drawings are similar to the Gesell picture (Item 7 above) but in the series one part only is missing in any one picture, while in the Gesell test several parts are simultaneously absent. The missing part is either a single member, as one leg, or members of a pair,

as two arms, or half a member, as half the trunk or hair on one side of the head only. In reproducing the Gesell picture other minor changes were made with the purpose of increasing ease of recognition: the arms extend downward; there are five fingers instead of three; the legs are longer and the conformation of the facial features is somewhat more realistic. The parts missing and the order of presentation are as follows:

a) Both legs and feet.
b) Both arms and hands.
c) Head.
d) One leg and foot.
e) One side of the head, one eye, half the mouth.
f) One arm and hand.
g) Both eyes.
h) Trunk.
i) One eye.
j) Half the trunk.
k) Mouth.
l) Both ears.
m) Both feet.
n) Nose.
o) One ear.
p) One foot.
q) Hair.
r) Both hands.
s) Hair on one side of head.
t) One hand.
u) One side of the neck and half the necktie.

9. Tracing of Porteus mazes (6, p. 86).
10. Discrimination of forms (28).
11. Seguin form board.
12. Naming four coins (28).
13. Counting 4, 10, and 13 pennies (28).
14. Action Agent Test (27, p. 146).
15. Definitions: use or better (28).
16. Comparison of lines (28).
17. Naming colors (28).
18. Aesthetic comparison (28).
19. Giving the number of fingers (28).
20. Finding omissions in pictures (28).
21. Repetition of digits (28).
22. Comprehension questions (28).
23. Repetition of phrases and sentences (28).
24. Walking boards.[6]
    Time and error scores are taken on a series of four boards, 8, 6, 4, and 2 inches wide, respectively.
25. Free play period.[6]
    Observation and stop-watch records of spontaneous play

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[6] For observation of Items 24 and 25 the child was taken to another room.

behavior under controled conditions for a period of 15 minutes.

2. *Second Sitting.*

26. Binet pictures (28).
27. Drawing Situation 4.
28. Pellet and bottle situations.[6]
29. Drawing Situation 6.
30. Drawing Situation 5.
31. Comparison of weights (28).
32. Drawing Situation 7.
33. Eye preference test.
    The Miles V-Scope and a series of pictures of simple objects are used.
34. Hand preference in clasping hands.
35. Distinguishing right and left (28).
36. Pointing out parts of the body.
    As an introduction to Situation 8 of the drawing series (Item 37) the child is asked to point to the parts of his own body as the examiner speaks the name of each in turn. Instructions: "Show me your nose. Put your finger on your nose." "Show me your eyes," etc. Order as follows: Nose, eyes, mouth, hair, legs, arms, head, stomach, feet, hands, ears. The term "stomach" is used rather than "trunk" or "body" because of the finding, in preliminary work, that the latter terms are more confusing and less specific to the child. Since both the instructions and the order of the first four items are those used in the Stanford Binet test at the three-year level (28) the child's response to these is scored for inclusion in the mental age rating secured by this scale.
37. Drawing Situation 8.
38. Drawing bubbles (6, p. 133).
39. Giving sex (28).
40. Giving family name (28).
41. Drawing Situation 9.
42. Additional items of the Stanford Binet Scale.
43. Hand preference in ball throwing.

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[6] The early phases of the pellet and bottle behavior have been described by Gesell and Thompson, and tentative norms are given for 60 months of age (*9a*, pp. 54, 121, 268).

D. DRAWING SITUATIONS

For all drawings exclusive of those in Situations 5 and 6, paper 8½ by 11 inches was used. In Situations 5 and 6, the "Little Man" and the "Big Man" at the second sitting, the measurements of the sheet were 20 by 15 inches. The conditions imposed, the examiner's instructions, and the purpose for which each of the several situations was designed, are as follows:

1. *First Sitting.*

a. Situation 1, the "Man."

Conditions: No suggestions are offered other than naming the object to be drawn. The method of presenting the materials has been described above. If in Item 2 the child has announced, previous to the first stroke, that he is drawing a man this item is taken as Situation 1 and a second man is not requested.

Instructions: "Draw a man."

Purpose: The drawing is used as a norm for comparison with succeeding situations. Since it initiates the drawing series and precedes the man completion series, it is free from the influence of the special conditions later imposed and free from any practice effect within the series. It is taken as the child's spontaneous graphic pattern of a man.

b. Situation 2, the "Little Man."

Conditions: A verbal suggestion of size is offered.

Instructions: "That's good. Now make a little bit of a man."

Purpose: The situation offers a measure of the extent to which the child's spontaneous graphic pattern is reduced in size in response to the examiner's verbal request.

c. Situation 3, the "Big Man."

Conditions: The examiner gives a verbal suggestion of size in the opposite direction from that requested in Situation 2.

Instructions: "And now draw a great big man."

Purpose: The situation offers a measure of the extent to which the child will enlarge his drawing in response to a verbal request.

2. *Second Sitting.*

a. Situation 4, the "Man."

Conditions: The conditions are identical with those in Situation 1 except for the possible practice effect of the preceding items in the drawing series and the influence of the suggestions previously offered.

Instructions: "Draw a man."

Purpose: The drawing is used as a norm for judging adaptation to the conditions pertaining to size in the two following situations and for comparison with Situation 1, in which the immediate conditions are identical.

b. Situation 5, the "Little Man."

Conditions: The same verbal suggestion of size is offered as that given in Situation 2 but in the present case the area of the paper is approximately three times that used in Situation 2.

Instructions: "That's good. Now make a little bit of a man."

Purpose: The percentage of decrease in size of Situation 5 over Situation 4 when compared with the percentage of decrease in size of Situation 2 over Situation 1 offers a measure of the extent to which an increase in the size of the paper affects the child's adaptation to verbal instructions which suggest a decrease in size.

c. Situation 6, the "Big Man."

Conditions: The same verbal suggestion of size is offered as that given in Situation 3, but in the present case the area of the paper is increased in the ratio of 3 to 1.

Instructions: "And now draw a great big man."

Purpose: The percentage of increase in size of Situation 6 over Situation 4 when compared with the percentage of increase in size of Situation 3 over Situation 1 offers a measure of the extent to which an increase in the size of the paper affects the child's adaptation to verbal instructions which likewise suggest an increase in size.

d. Situation 7, the "Copy of a Man."

Conditions: A simplified schematic drawing of a man in mimeographed form is presented.[7] Except that the drawing is complete the picture is the same as those of the man completion series.[8] The child is permitted to handle the picture if he wishes. It is then placed flat upon the table top with a blank sheet in standard position between the picture and the child. The examiner holds the picture in the original position throughout the drawing process but the child is permitted to rotate his own sheet as he wishes. If he attempts to draw upon the copy he is restrained with the comment given below.

---

[7] See Figure 1.

Instructions: As the mimeographed drawing is presented the examiner comments, "Here is a man that somebody else drew. Look at it carefully." After the child has handled it and it has been placed flat upon the table the examiner says, "Now you draw one that looks just like this one." If the child attempts to mark upon the picture the examiner says, "No, this man is finished; you make one of your own, just like him."

Purpose: The response to this situation serves as a measure of the extent to which the child modifies his spontaneous graphic pattern of a man to accord with a visible copy which represents a stage of drawing development but slightly in advance of that shown in his own spontaneous drawings. The schematic representation of the human figure shown in the picture to be imitated is of the sort commonly found in the drawings of children near six years of age. The parts of the body represented and the contour of the graphic forms are comparable to what is found in many four-year-old drawings, *but the number of parts and their mutual orientation* approximate the six-year level.

e. Situation 8, the "Man on Dictation."

Conditions: Following Item 36, in which the child points out parts of his own body on request, he is asked to draw a man, representing one part at a time as the examiner speaks its name. All the major divisions of the body are thus verbally suggested one by one in the following order: Head, eyes, nose, mouth, stomach, legs, feet, arms, hands, ears, hair.[9] As in Item 36, the term *stomach* is used as a substitute for *trunk*, because of the finding, in preliminary work, that the words *trunk* and *body* are less specific and more confusing to the child than is the more familiar term *stomach*.

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[8] See above Item 8.

[9] In the case of a few children fingers and toes also were requested.

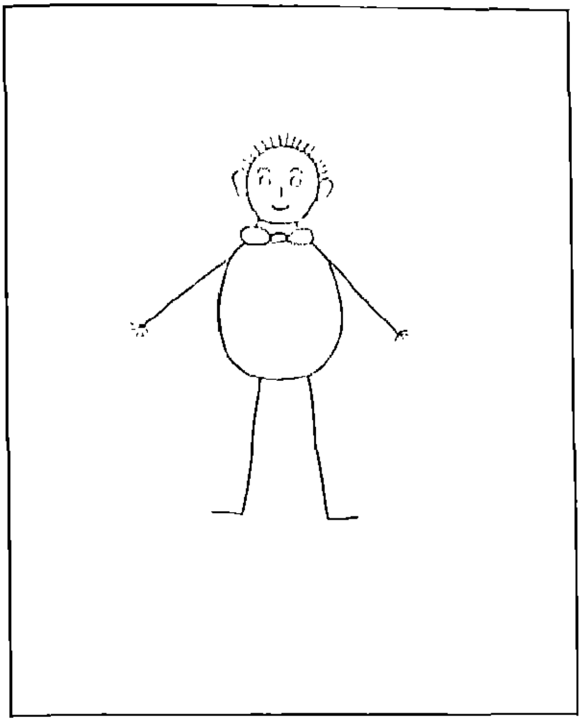


FIGURE 1

The Picture Presented for the Child to Copy in Situation 7, the "Copy of a Man"

Instructions: At the completion of Item 36 the examiner says, "That's good. Now draw a man and put in the picture all the things you showed me. You showed me where your head is, didn't you? Draw the man's head. Just the head. Don't draw anything more until I tell you to." After the head is drawn the examiner continues, "And you showed me where your eyes are. Make the man's eyes." Following the response to this request the next part is called for, "Now draw his nose . . . and now his mouth," etc. If the child anticipates a request by drawing a part before it is called for he is again urged to draw just one part at a time and then wait until the next part is requested.

Purpose: The "Man on Dictation" tests the child's ability to

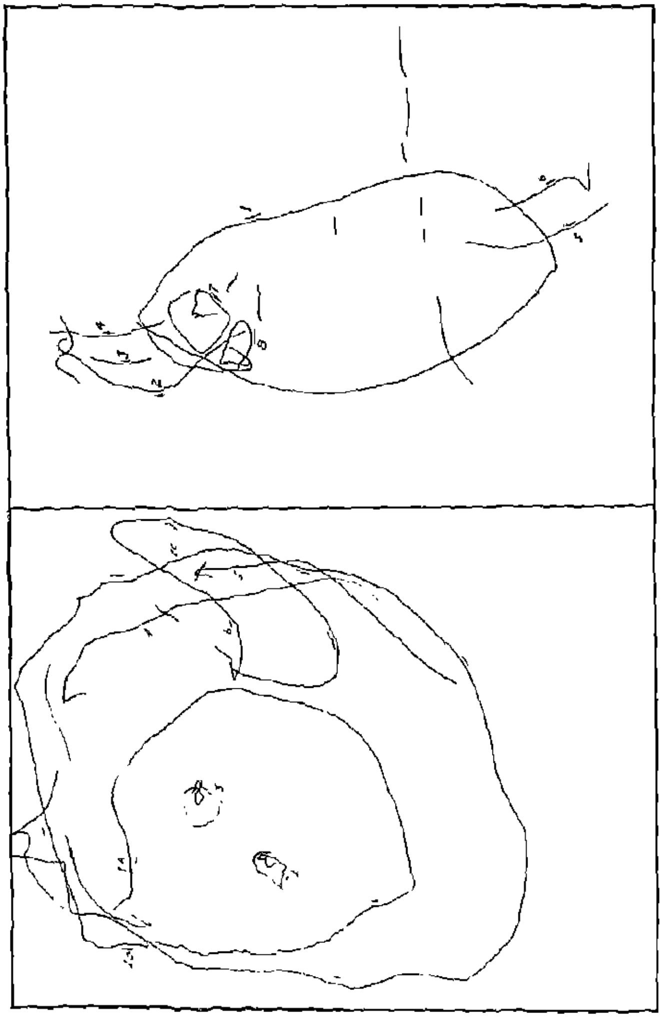


FIGURE 2

SUBJECT 7

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

"How? Like this?"

Line 1 At 1B, "I can make a bird."
At 1C, "A lady."

Line 2 "Here the eye."

Line 3 "Here the two eyes."

Line 4 "That goin' to be a birdie."

Line 5-6

(*Right*)

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

Line 1 "That way?"

Line 2 "Him foot."

Lines 3-4

Line 5 "This one him foot."

Line 6

Line 7 "Here him eye."

Line 8

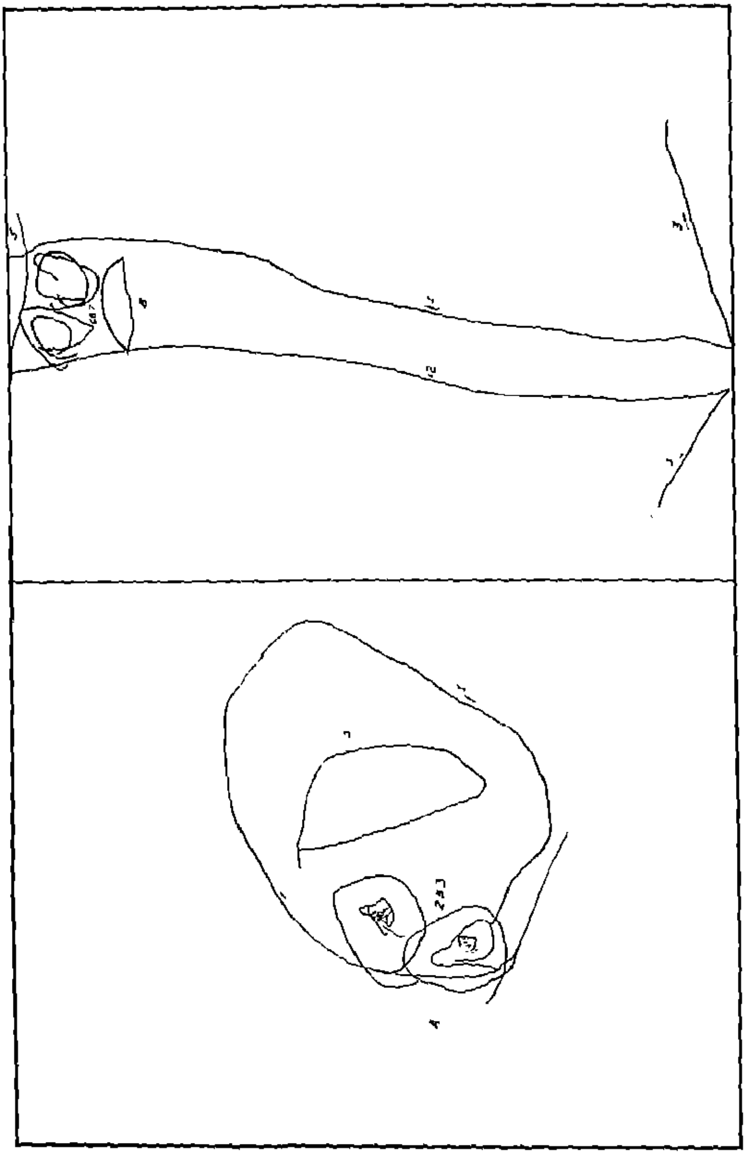


FIGURE 3

SUBJECT 14

(*Left*)

Situation 1: *Man*. 1st Day.

Record of Drawing:

"I can draw a boy. No, I can't. Make a funny face."

Lines 1-4 Rotates 90 degrees clockwise; *A* becomes top.

Q. 1 "Face."

Q. 2 "Eye. Eye." When *E* questioned concerning pupil, child said, "Eye. Eye. I told you. Eye just the same," almost screaming with annoyance.

Q. 4 "Mouth."

Q. total "Boy.'

(*Right*)

Situation 3: *Big Man*. 1st Day.

Record of Drawing:

When *E* requested the "Big Man," the child started to refuse, then showed interest, chuckled, and complied.

Lines 1-2

Lines 3-4 "Great big man. That's his foots. Big foot and a little foot."

Lines 5-8

Q. 1-2 "Legs."

Q. 6-7 "Eyes."

Q. 8 "Mouth."

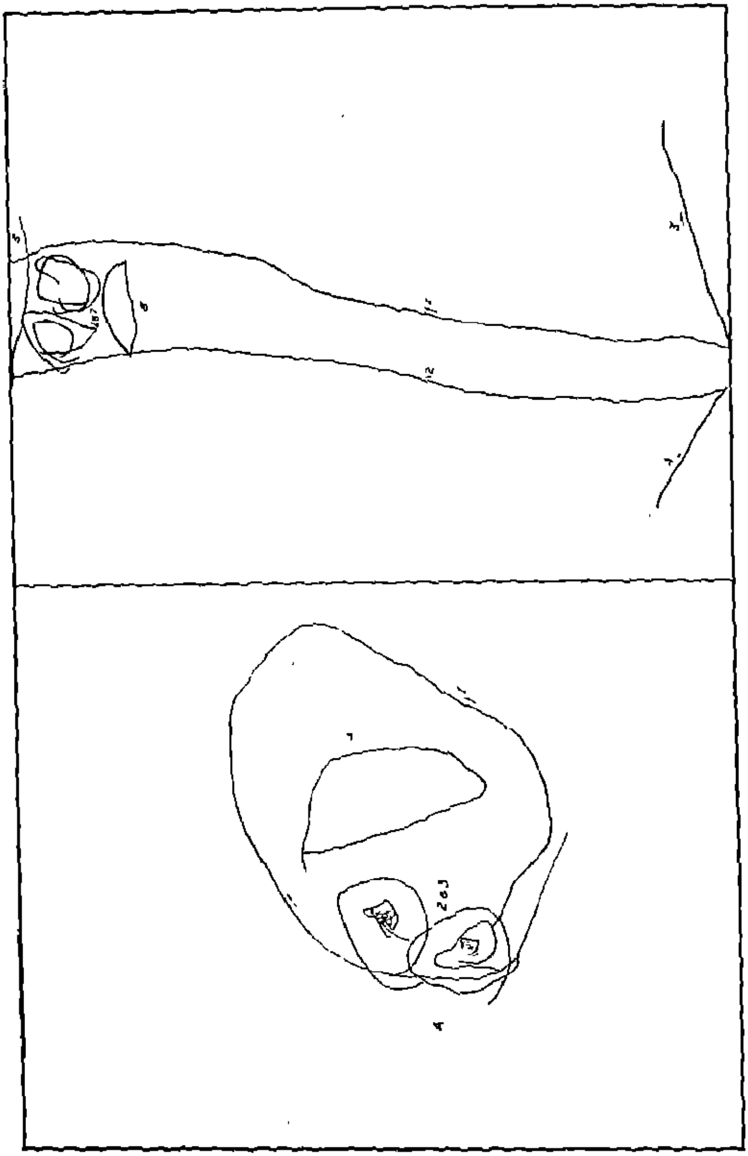

5
6&7
8
11
12
3
1
11
2&3
4

FIGURE 3

SUBJECT 14

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

"I can draw a boy. No, I can't. Make a funny face."

Lines 1-4 Rotates 90 degrees clockwise; *A* becomes top.

Q. 1 "Face."

Q. 2 "Eye. Eye." When *E* questioned concerning pupil, child said, "Eye. Eye. I told you. Eye just the same," almost screaming with annoyance.

Q. 4 "Mouth."

Q. total "Boy.'

(*Right*)

Situation 3: *Big Man.* 1st Day.

Record of Drawing:

When *E* requested the "Big Man," the child started to refuse, then showed interest, chuckled, and complied.

Lines 1-2

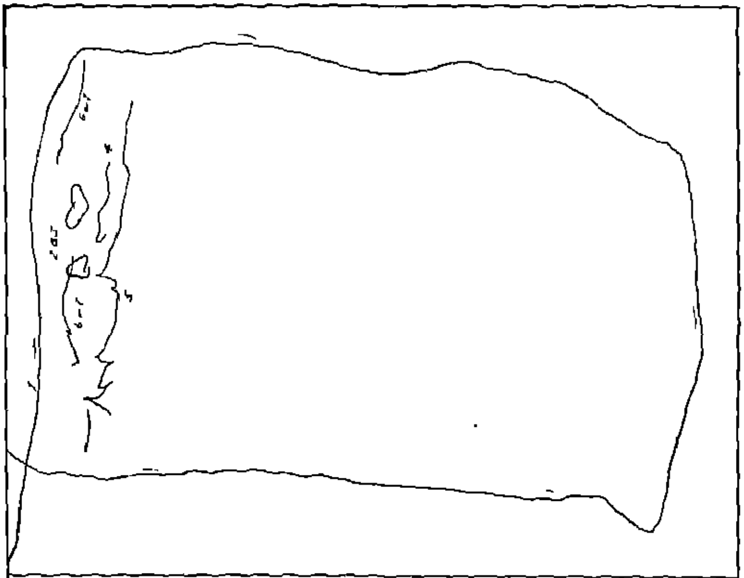
Lines 3-4 "Great big man. That's his foots. Big foot and a little foot."

Lines 5-8

Q. 1-2 "Legs."

Q. 6-7 "Eyes."

Q. 8 "Mouth."



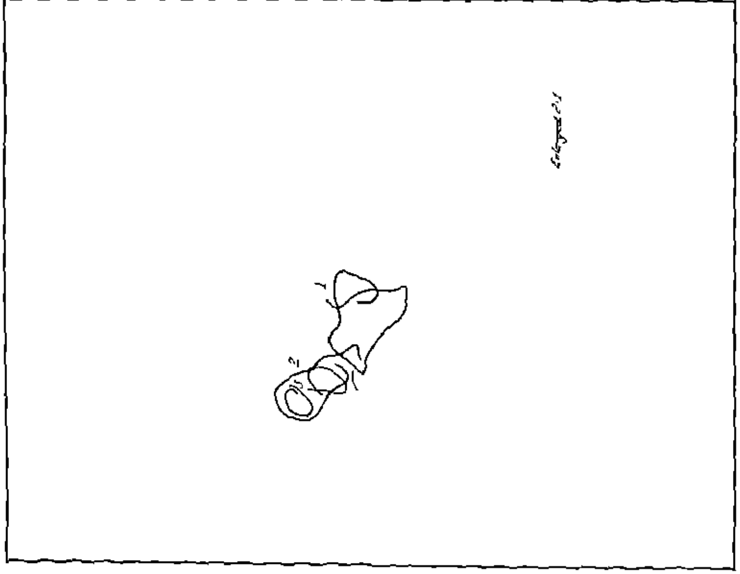

Enlarged 2:1

FIGURE 4

SUBJECT 16

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

Lines 1-3
Q. 1 "Feet."
Q. 2 "Head."
Q. 3 (2 circles) "Eye. Eye."

(*Right*)

Situation 4: *Man.* 2nd Day.

Record of Drawing:

Lines 1-5
Q. perpendicular lines of 1 "Feet. Big feet."
Q. 2-3 "Eyes."
Q. 4 "Mouth."
Q. 5 "A table for holding tea."
After paper is removed he reaches for it.
Lines 6-7 "Arms."

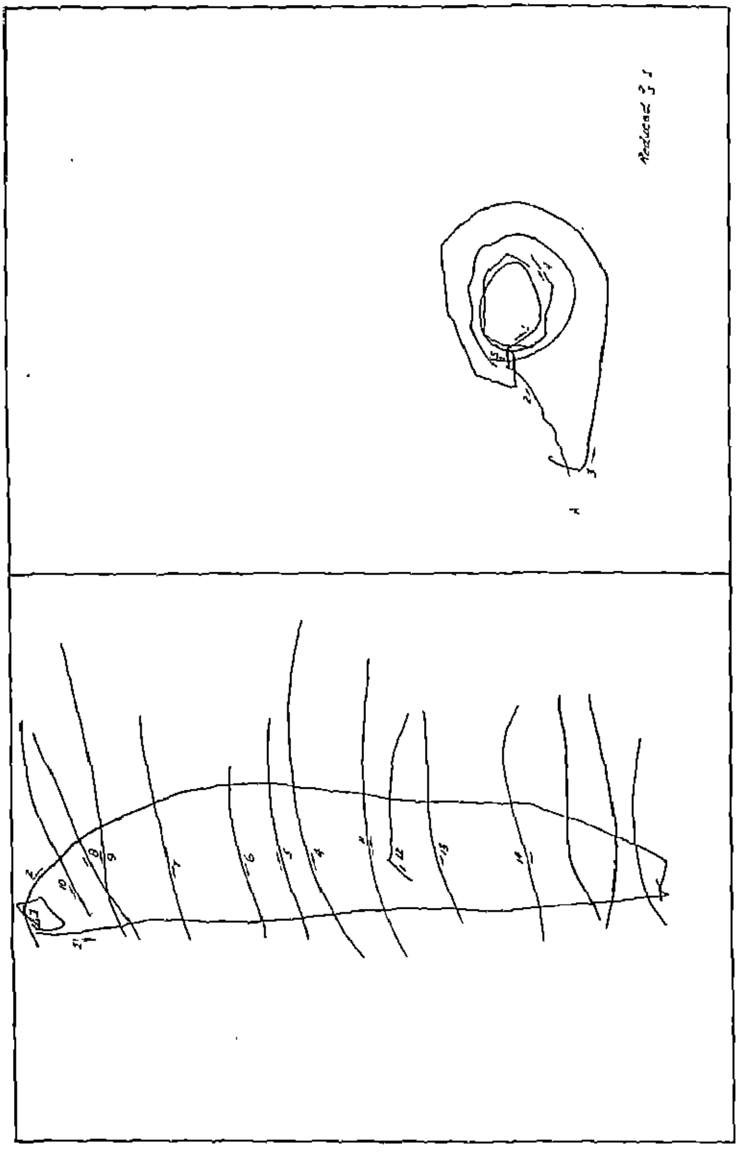

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FIGURE 5

SUBJECT 11

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

Lines 1-2 "There a man."

Line 3

Q. 3 "Man."

Lines 4-14

Q. 4-14 "Man."

Q. 3$_2$ "His neck."

"I made . . ." Gets up and looks out window, ". . . a man out there."

(*Right*)

Situation 5: *Little Man.* 2nd Day.

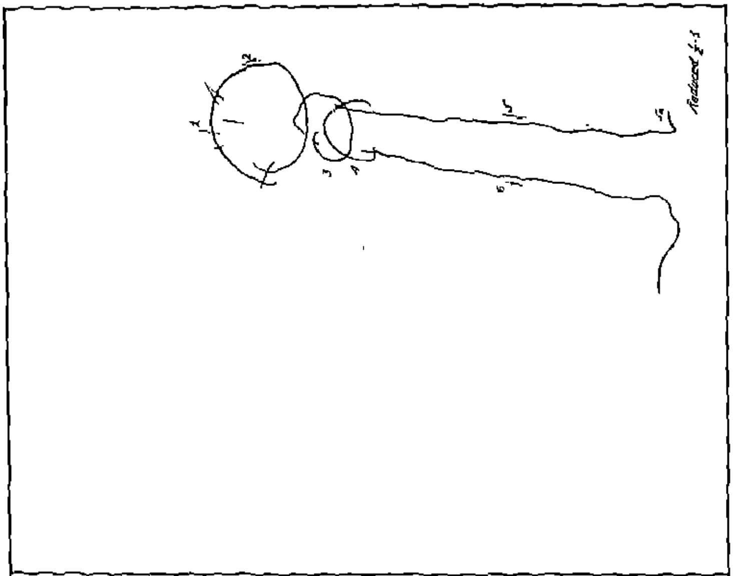
Record of Drawing:

Lines 1-3

Q. 1 "His neck." Then points to same line, saying, "His hair." Rotates 90 degrees clockwise; *A* becomes top.

Lines 4-5

Q. 3 "A sail boat."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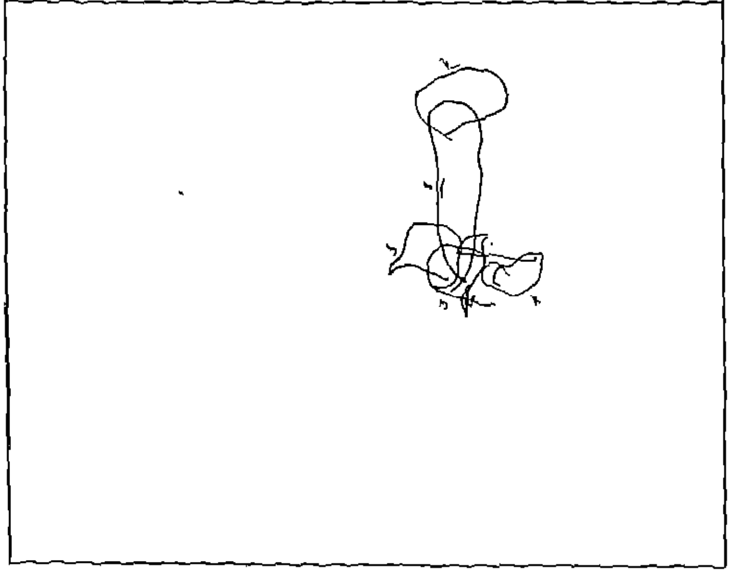
2
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FIGURE 6

SUBJECT 1

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

Line 1 "That's his head."
Line 2 "Them are his shoes."
Line 3 "This is his shirt."
Line 4 "That's his ear."
Line 5 "And his other ear."

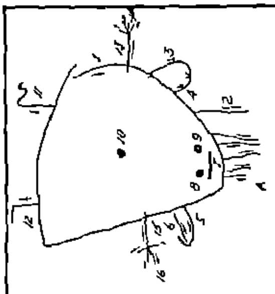
(*Right*)

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

"I can't." Draws with marked concentration.

Lines 1-4
Line 5 "There's his toe nails," pointing to *5a.*
Line 6 "There they are."
Q. 1 "His hair."
Q. 2 "His face."
Q. 3 "His chest." Points to his own chin and repeats, "His chest."
Q. 4 "His chest."
Q. 5 Refuses to answer. Points to *5a*, "And there are his toe nails."
Q. 5_2 "Where you put his stockings on."
Q. 6 "Line for his stockings."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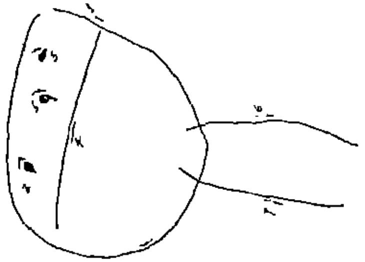

FIGURE 7

SUBJECT 8

(Left)

Situation 1: *Man.* 1st Day.
Record of Drawing:

Lines 1-7
Q. 4 "Mouth."
Q. 2 "Eye."
Q. 5 "Nose."
Q. 3 "Eye."
Q. 7 "Leg."
Q. 6 "Leg."
Q. 1 "A man."

(Right)

Situation 7: *Copy of Man.* 2nd Day.
Record of Drawing:

Line 1
Rotates 180 degrees; *A* becomes top.
Lines 2-9
Line 10 "That's his stomach."
Lines 11-14 "Let me show this to Mummie."
Lines 15-16
Q. 7 "Eyebrow."
Q. 3-4 "Ear."
Q. 2 (6 strokes) "That holds his eyes up."
Q. 16 "Fingers."

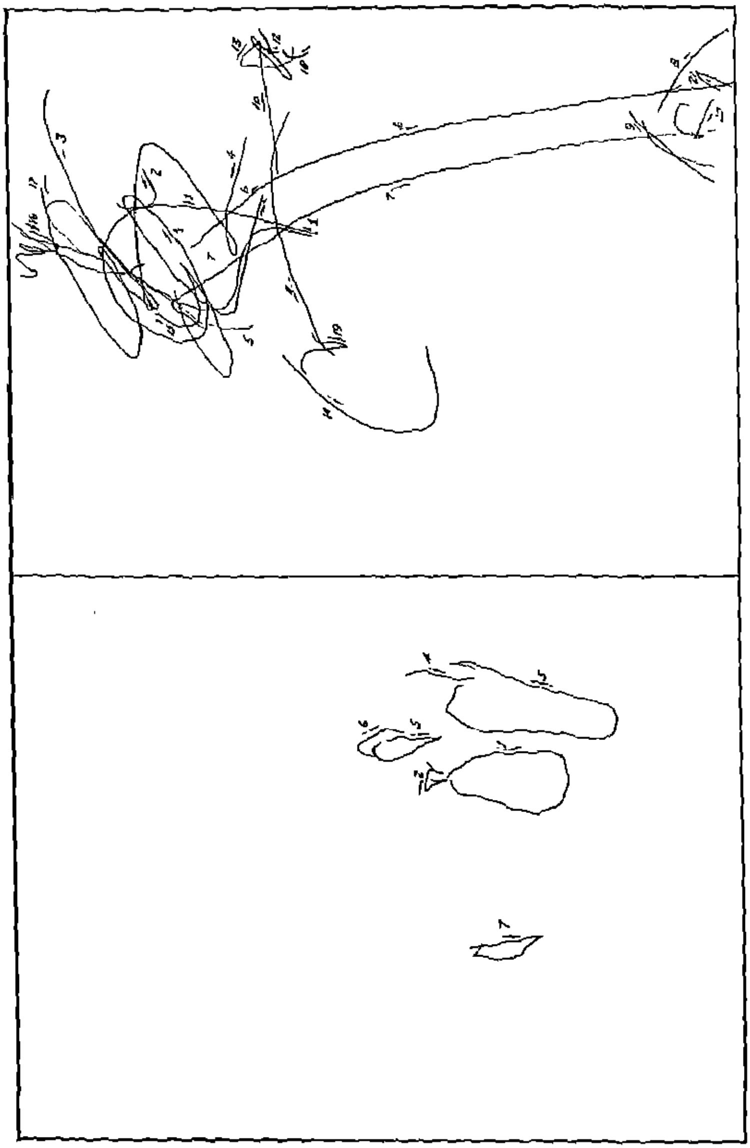

FIGURE 8

SUBJECT 9

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

Lines 1-2 "Now see what's that. It's a man."
Lines 3-4 "This is a bigger man that this one," comparing lines 3-4 with 1-2.
Line 5
"Now I'm going to draw his eyes."
Line 6 "Make his eyes."
Line 7

(*Right*)

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Line 1
Eyes	Line 2 (single half circle)
Nose	Line 3
Mouth	Line 4
Stomach	Line 5
Legs	Lines 6-7
Feet	Lines 8-9
Arms	Lines 10-11
Hands	Lines 12-14
Ears	Lines 15-16
Hair	Line 17
Fingers	Lines 18-19
Toes	Lines 20-21

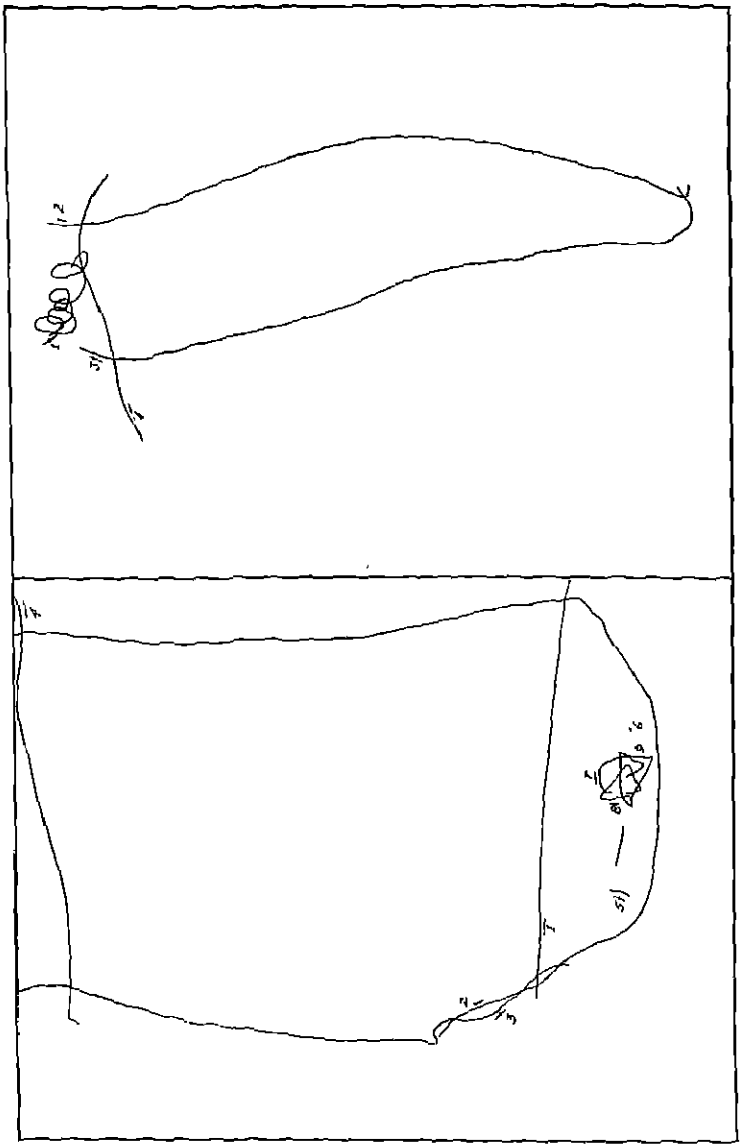

FIGURE 9

SUBJECT 12

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

Line 1 "This way? . . . I can't."
Lines 2-3 "Oh, funny!"
Line 4 Holding pencil in both hands.
E. "Where is the man?"
"He's in a house."
Line 5 *Q.* "Toys."
Line 6 "Pencil . . . ball."
Line 7 *Q.* "A house to play with."
Line 8 "I'm making a swing."
E. "Where is the man you were going to make?"
"He's in the house."
Line 9
E. "Is that the man?"
"He's outside playing now."

(*Right*)

Situation 9: *Man from Description.* 2nd Day.

Record of Drawing:

Listened to *E*'s description with rapt attention. When *E* described the "big, long legs," child asked, "Can he walk?"

Lines 1-3
"Now I'm gonna close his legs."
Line 4
E. "Where's the head?"
Points to line 1.
E. "Where are the legs." Points to 2-3.

As drawing is being removed, says, "It's a big, long birdie!"

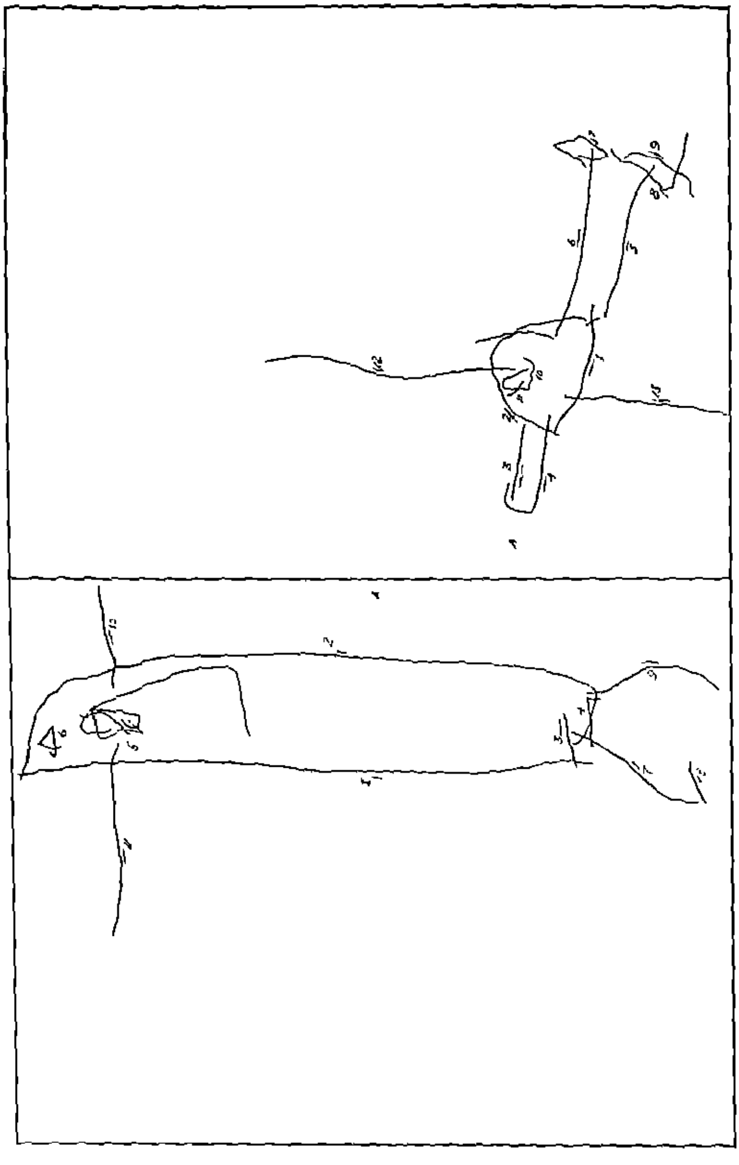

FIGURE 10

SUBJECT 5

(*Left*)

Situation 1: *Man.* 1st Day.

Record of Drawing:

Lines 1-4

Rotates 90 degrees counterclockwise; *A* becomes top.

Lines 5-6 "Here the eyes."

Stops. *E* points to line 4, asking what it is. This serves as stimulus for further drawing.

Line 7 "Here the leg.

Line 8 "Leg."

Line 9 "'Nother leg."

"Arms . . . gonna make." Lines 10-11.

Q. 1-2 "That's a man . . . a big man."

(*Right*)

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

Lines 1-2

Line 3 "Here the arms."

Lines 4-6

Line 7 "Shoes."

Lines 8-9 "Other shoes."

Lines 10-11 "Here the eye . . . 'nother eye."

Rotates 90 degrees clockwise; *A* becomes top.

Line 12 "Arm."

Line 13 "'Nother arm."

Q. 3-4 "Hat."

Q. 6 "Legs."

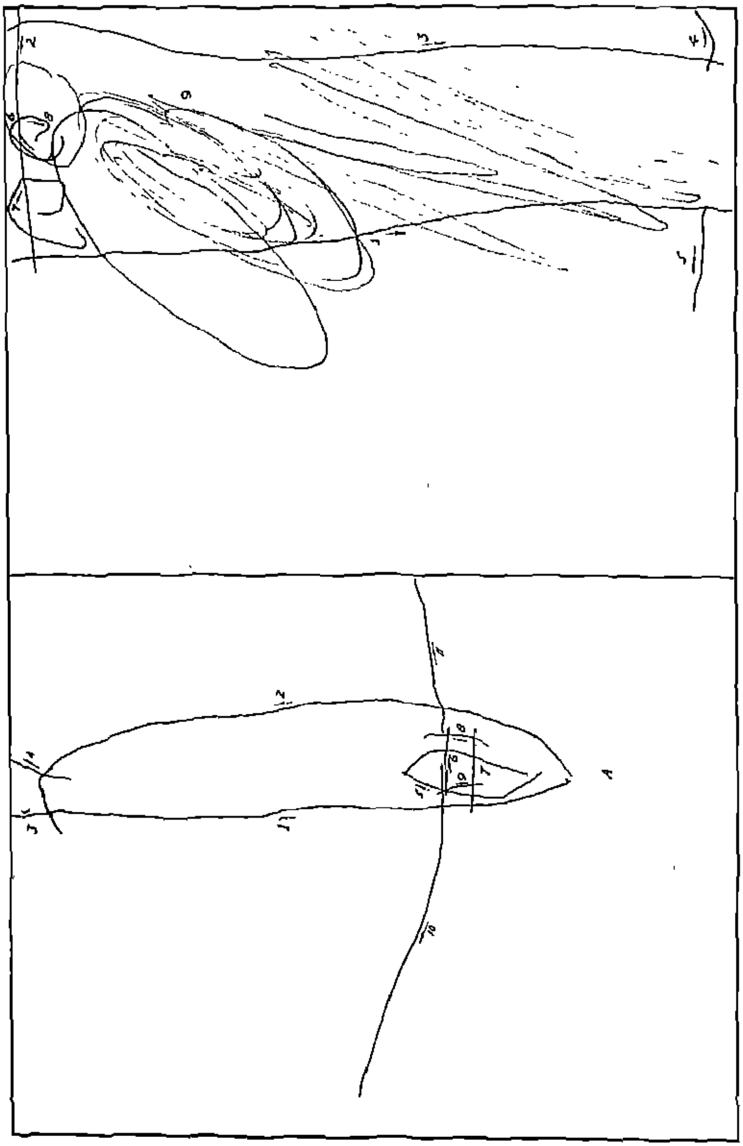

FIGURE 11

SUBJECT 5

(Left)

Situation 3: *Big Man.* 1st Day.

Record of Drawing:

"I can't . . . you do."
Lines 1-9
Rotates 180 degrees; *A* becomes top.
Line 10 "Arm."
Line 11 "'Nother arm."
Q. 1-2 "That's a big man."
Q. 5 "Ear."
Q. 6-9 "Ear."
Q. 4 "Leg."

(Right)

Situation 4: *Man.* 2nd Day.

Record of Drawing:

Lines 1-3
Line 4 "Leg."
Line 5 "Other leg."
Line 6 "The eye."
Line 7 "The other eye."
Line 8 "Ear."
Line 9 Scribbles in irritation as if trying to obliterate drawing.
Q. 9 "Rain."

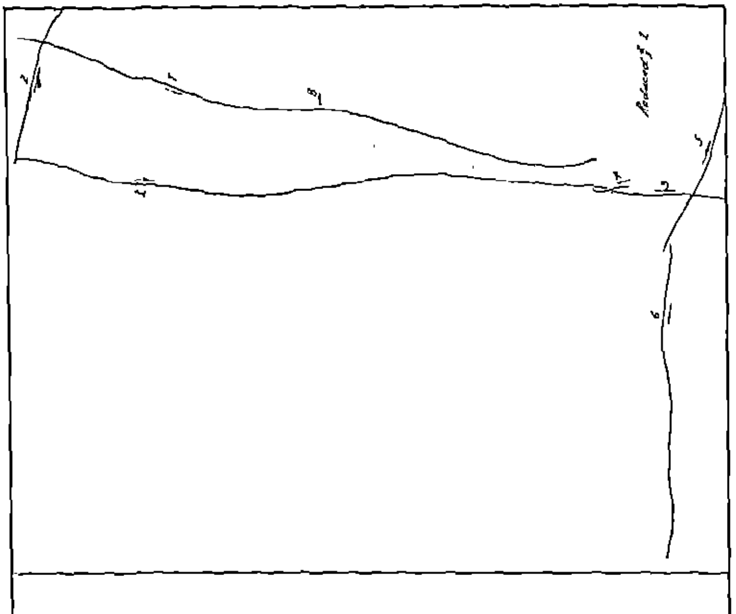
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FIGURE 12

SUBJECT 5

(*Left*)

Situation 5: *Little Man.* 2nd Day.

Record of Drawing:

Stands leaning over sheet in such position that *A* is at top.

Lines 1-11

Q. 2 "That's a leg."

Q. 4 "His foot."

Q. 8 "Sore foot."

Q. 9-11 Refusal.

(*Right*)

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

Lines 1-8, without comment.

Q. 5 "A arm."

Q. 6 "A arm."

Q. 8 "That's a belly button."

Q. 2 "Arm," with only a casual glance.

differentiate and synthesize the various parts of the body when reminded of each in turn. The repeated reenforcement of attention offers opportunity for a more complete graphic expression of the various relationships, which together make up the concept of a man, than is possible within the short attention span characteristic of this age. The segmental drawing required by the conditions imposed tests also the child's ability to interrupt his accustomed sequence of drawing movements and rearrange the temporal order in which the parts are represented.

f. Situation 9, the "Man from Description."

Conditions: Two parts of the body are named by the examiner and a verbal suggestion offered which pertains to their relative size.

Instructions: "I saw a funny man on the street this morning. He had a little bit of a head and great big long legs. He was a very funny man (*laughs*). A little bit of a head and great big long legs. You draw a man that looks just like him."

Purpose: The conditions offer an opportunity to measure the child's ability to modify the relative proportions of parts in his graphic pattern in response to a humorous verbal description.

A control for the results obtained under the varying conditions of the several situations is found within the series itself. No control group is used. The graphic patterns secured in Situations 1 and 4 serve as norms for judging the effect of the specific verbal and visual suggestions offered in succeeding situations.

To show the character of the material to be analyzed, the nature of the verbal record, and the line-by-line construction of the drawings, results are anticipated at this point by an illustration from each of the experimental situations (Figures 2-9). Each drawing may be compared with that secured from the same child in Situation 1. In addition, the first six drawings (Figures 10-12) of Subject 5 are reproduced to illustrate the sequence of graphic patterns found within the drawings of an individual child.[10]

---

[10] The illustrations are photographs of tracings of the original drawings. All tracings were made on paper 11 x 8½ inches. In the case of drawings made on larger paper, in Situations 3 and 6, the tracings were reduced in size so as to maintain the same relative proportion between drawings and paper as that found in the originals. A few drawings were too small to be reproduced without enlargement. In all cases in which the size of the tracing differs from that of the original a notation shows the extent of the change. The borders of the 11 x 8½ inch sheets are indicated in the reproductions. The actual measurements of the drawings in Situations 1 to 6 are given in Table 16.

III. RESULTS

A. THE FORMULATION OF CRITERIA FOR DETERMINING THE PARTS OF THE BODY DRAWN

In the early stages of the child's ability to draw the human figure, progress is shown primarily by the number and the choice of parts of the body which are graphically differentiated one from another. In studies which have traced successive phases in the graphic patterns of an individual child (23), in those which have compared the drawings of different age groups (21), and in the scales devised for the measurement of drawing ability (3 and 19) or the measurement of mental age as manifested in drawing (10), the differentiation of whole into parts is the chief factor by which developmental level is judged. The degree of synthesis of the differentiated parts, their orientation one to another, and their relative proportion, all of which are important factors in the final product, are dependent upon the graphic recording of parts.

When one attempts to tabulate the parts of the body represented in the drawings secured from our experimental group numerous inconsistencies become apparent. A section of the drawing may suggest a certain part to the examiner and yet be named a different part by the child. In successive drawings the same graphic form may receive several names. In the absence of all verbal explanation by the child two adults may disagree as to what part is suggested by the visual appearance of the graphic form. In so far as possible these inconsistencies must be reconciled in the criteria to be used in determining what parts are represented in the pictured man.

The visual appearance of the drawing to adult eyes is the customary criterion. In studies in which the drawing process has been observed and the child's comments noted (23, 16, 5) visual appearance is often supplemented by information obtained from the child's naming. In studies in which no information is available beyond the completed drawing, visual appearance to the adult is the sole criterion possible for tabulation of the parts of the body represented. Goodenough's (10) scale for the measurement of intelligence by drawing is designed for scoring of the final product on the basis of visual appearance alone. Many of the scale points deal with the presence of some part of the body. It is possible to earn a mental age rating of six years by the graphic enumeration of parts regardless of their synthesis, provided only that their contour or their orientation one to another is sufficiently well represented to indicate the child's intention.

That these clues of contour and orientation are unreliable indices, in drawings as primitive as those of the present study, is demonstrated by the high frequency of disagreement between judges when the graphic patterns are scored by the Goodenough scale. Ratings on the 140 drawings were secured from two judges working independently. They were unfamiliar with the conditions of the experiment, uninformed as to the number and age of the subjects and of the child's comments during the drawing process. They were told only that the collection had been secured from young children in response to the request to draw a man.[11] There is disagreement as to what part is intended by a given line, disagreement as to whether the line represents any part whatsoever, and disagreement as to whether the production as a whole can be recognized as an effort to represent the human figure or should be scored as a scribble in which there is no differentiation of parts. The frequency of occurrence of these variations in scoring is given in Table 2.

TABLE 2

DISAGREEMENT BETWEEN TWO JUDGES IN RECORDING THE PARTS OF THE BODY DRAWN WHEN ALL DRAWINGS OF THE EXPERIMENTAL SERIES ARE SCORED BY THE GOODENOUGH SCALE FOR THE MEASUREMENT OF INTELLIGENCE BY DRAWING

Number of parts in which disagreement occurs	Number of drawings	Per cent of drawings
1	28	20
2	21	15
3	7	5
4	3	2
5	1	1
6	1	1
Disagreement on one or more parts	61	44

An instance may be cited in which the child's naming shows the decisions of both judges to be erroneous. In S12-1[12] both judges score head, trunk, and eyes, and one scores nose and mouth in addition to these parts. The child's comments during construction of the drawing reveal the "man" to be a single undifferentiated line, surrounded by "toys," "pencil," "ball," "swing," placed inside a "house." The visual appearance of a part is not only inaquate to reveal the child's intention but may lead one completely astray.

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[11] See below for further details.

[12] Subject 12, Situation 1. This notation will be used throughout. See Figure 9.

Further inconsistencies are discovered when one attempts to use the child's naming of segments of the drawing as a secondary criterion to supplement that of visual appearance.

1. The visual appearance of a part may be at variance with the name assigned it by the child. Two vertical lines extending downward from the head appear to the adult to be intended for legs, but Subject 4 in several consecutive drawings names these vertical lines[13] feet and the horizontal lines attached to their extremities toes. Does the child intend to represent feet and toes or is he confused in his use of the verbal symbols for the various parts which compose the limbs? In S5-3 two rough squares[14] are drawn inside the head. They appear to be intended for eyes but are specifically named ears by the child. Has he drawn ears and misplaced them or eyes and misnamed them?

2. The child may show obvious confusion in his use of the verbal symbols for the various parts of the body. In S1-6 the subject[15] names the circle between head and legs "his chest," but as he does so points to his own chin in explanation of the part drawn.

3. The child may be unable to designate verbally the part which he has drawn. Groping for words he may call the circle to which the limbs are attached "the big round thing what he has with" (S15-3),[16] or he may name the two lines extending downward from this big round thing "where you put his stockings on" (S1-6).[17] After repeated requests from the examiner to name the form which contains the facial features and to which the limbs are attached he may respond hesitatingly, "The line . . . the line that goes up to his feet" (S8-4).[18]

4. The subject may designate a part of the drawing by one name

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[13] See S4-1, Figure 18.
[14] See Figure 11.
[15] See Figure 6.
[16] See Figure 26.
[17] See Figure 6.
[18] See Figure 17.

at the time it is drawn and by another when questioned after the whole is completed. In S5-2 the lines[19] called "arms" become a "hat" after rotation of the sheet and completion of the drawing from a new angle. In S11-9 the part called "head" becomes "feet" and the part originally named "legs" is later termed "neck." In this case the top-bottom relationship has been reversed without shift in the orientation of paper to child.

5. The same graphic form may be called by different names in successive drawings by the same child. The circle to which the limbs are attached may be called "head" in one trial (S15-2) and "trunk" in a later trial (S15-4). The horizontal lines attached to the extremities of the lower limbs may be named "legs" in one drawing (S5-1)[20] and later designated as "feet" (S5-5).[21]

6. A graphically undifferentiated form may be verbally divided into parts by assigning the names of various parts of the body to segments of its circumference. Subject 3 represents a man as a circular or oval form, at times without graphic differentiation of parts, at times with eyes and lower limbs added. In Situation 3 the circumference[22] of this circle is verbally differentiated into "legs" and "eyes", in[23] Situation 4 into "feet" and "belly", in[24] Situation 5 into "body" and "nose", and in Situation 6 into[25] "body" and "legs."

If the child's explanation of his drawing is to serve as a criterion for determining the parts of the body represented, the validity of his use of the verbal symbols for the parts of the concrete object which he is attempting to draw must first be ascertained. The test in which the subject points out parts of his own body as the examiner speaks the name of each part in turn[26] gives a measure of the accuracy of association between the conventional verbal symbols for these parts and the specific area of the child's own body designated by each.

All of our subjects indicated correctly all facial and head features: head, eyes, nose, mouth, hair, and ears. The stomach was located with reasonable accuracy by all but one child. Some pointed to the abdomen, some as high as the chest. Since the term was used as a substitute for trunk any location within the trunk area was considered correct. Subject 15 was puzzled by the term and said he had no stomach.

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[19] See Figure 10.

[20] See Figure 10.

[21] See Figure 12.

[22] See Figure 20.

[23] See Figure 22

[24] See Figure 22.

[25] See Figure 23.

[26] See above.

Unexpected confusions were found in differentiating between the parts composing the limbs. Table 3 presents the findings. No errors are recorded in locating legs or arms. The areas indicated varied from thigh to ankle, and from shoulder to wrist, but all were acceptable responses. When feet were called for, five children failed to indicate the part correctly. One clearly pointed to thighs, another to knees. The records of Subjects 7, 8, and 9 show uncertainty and confusion:

TABLE 3

AREA OF THE CHILD'S OWN BODY ASSOCIATED WITH THE VERBAL SYMBOLS FOR THE PARTS COMPOSING THE LIMBS

Part requested by examiner	Part indicated by Child	Subjects 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	No. S's	% S's
Legs	Thighs	x																1	
	Knees						x	x		x	x	x	x					6	
	Shins				x	x			x									3	
	Correct (Unrecorded)		x	x										x	x	x	x	6	
Arms	Upper arm							x			x							2	
	Elbow			x					x				x					3	
	Forearm		x		x	x	x			x		x						6	
	Correct (Unrecorded)	x												x	x	x	x	5	
Feet	Correct	x		x	x	x	x				x	x	x	x	x		x	11	
	Shins							x	x	x								3	
	Knees		x															1	
	Thighs															x		1	
Hands	Correct	x			x				x	x	x	x	x	x	x	x	x	11	
	Forearms		x			x	x											3	
	Shoulders			x				x										2	
Inaccurate differentiation of parts of:																			
Lower limbs			x					x	x	x						x		5	31
Upper limbs			x	x		x	x	x										5	31
Lower or upper limbs			x	x		x	x	x	x	x						x		8	50

*S*7. Starts below knee and runs hand downward to the feet, indicating that the whole lower leg is "foot."

*S*8. Places hand on knees and progresses part way down lower leg, ending uncertainly.

*S*9. Places hands uncertainly on legs below knees and runs hands down to ankles. Looks at *E* enquiringly.

Pointing out the hands is somewhat awkward since in this case the member commonly used for pointing is the part called for. Eleven children clearly indicated the hands by clasping them, turning them over to exhibit the palms, or pointing to one hand with the finger of the other hand. Five subjects gave evidence of confusion: two placed hands upon shoulders, three pointed to the forearm. Eight subjects, 50 per cent of the group, confused parts in either upper or lower limbs or both.

Correct identification of the facial and head features is commonly found as early as two or three years of age (6, p. 156, 28, p. 142), but there is evidence that confusion exists, even among school children, in differentiating certain other body parts. G. Stanley Hall in his early study on concept development included questions pertaining to the child's own body. Among 200 subjects just entering school, ranging in age from 4 to 8 years and averaging well above 5 years, 6 per cent were "ignorant of the concept" of stomach, 45 per cent failed to differentiate hips, 7 per cent knees, 66 per cent ankles, 71 per cent wrists, 25 per cent elbows (12, p. 149). The form of the questions is not given nor the mode of response. They deal entirely with the finer divisions of the body.

Our evidence indicates that at four years of age the verbal symbols for certain of the grosser divisions of the body lack specificity. This inadequate delimiting of the area designated by the verbal symbol may result in an inconsistency between the visual appearance of a part in the child's drawing and the name assigned it.

The same confusions between the parts composing the limbs, revealed when the child points out the parts of his own body, are repeated in the man completion series.[27] We find furthermore that some of the subjects whose verbal differentiation is accurate in distinguishing parts of their own bodies exhibit the same confusions in the man completions which other subjects show in pointing out parts of their own bodies and which are repeated in the man completions.

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[27] See above.

In the completion series naming is an incidental response. If the subject completes the missing part promptly a verbal reply is not urged. Failure to name does not imply an inability to do so but only that the graphic response precedes the verbal. As a measure of the child's understanding of the verbal symbols we are concerned only with those instances in which incorrect naming of the missing part accompanies its correct identification by drawing or pointing. These are listed in Table 4.

TABLE 4
INCORRECT NAMING OF THE MISSING PARTS, CORRECTLY IDENTIFIED BY DRAWING OR POINTING, IN THE MAN COMPLETION SERIES

Parts missing in picture	Parts drawn or indicated by pointing	Naming of missing parts	Subjects 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	No. S's	% S's
Lower limb	Leg only	Hand						x											1	
Lower limb	Leg & foot	Hand											x						1	
Lower limb	Leg only	Foot			x							x		x	x				4	
Foot	Foot	Leg								x					x	x		x	4	
Upper limb	Arm only	Hand		x		x		x				x		x	x				6	
Hand	Hand	Arm			x														1	
Confusion in naming:																				
Lower limbs					x			x		x		x	x	x	x	x	*	x	9	56
Upper limbs				x	x	x		x				x		x	x				7	44
Either lower or upper limbs				x	x	x		x		x		x	x	x	x	x		x	11	69

*Subject 15 shows no confusion in situations in which leg or foot is missing, but when the trunk is absent he comments, "Somebody left his feet here," as he touches the top of the leg line.

In pointing out parts of the child's own body inadequate differentiation is limited to the parts composing a limb. In the man completion series there is confusion between the upper and lower limbs as well as between the parts composing each: the leg is misnamed "hand" as well as "foot." There is furthermore a higher frequency of occurrence of confusion than in the former situation. This difference suggests that even after the verbal symbols have been correctly associated with the parts composing a concrete object, these associations may not be carried over to the graphic representation of the object.

A comparison of Tables 3 and 4 shows that one child only, Subject 1, fails to give evidence of confusion in his use of the verbal symbols for the parts composing either upper or lower limbs or both, and in his case recognition of the missing parts in the completion series is inadequate to yield information on his use of the verbal symbols.

Since some subjects who show no confusion in pointing out parts of their own bodies exhibit the same confusions in the man completions which other subjects show in the former test and which are repeated in the completion series, is it not likely that still others who show confusion in neither of these situations will do so in their own drawings? Analysis of the drawing series shows this to be the case. Neither Subject 4 nor Subject 5 indicates a verbal confusion in pointing out parts which compose the lower limbs in his own body or in the man completions, but in the drawings of both these subjects, in which there is a clear graphic differentiation of the lower limb into its parts, the naming is inaccurate. Subject 5 calls the horizontal foot "leg." Subject 4 names the vertical lines "feet" and the horizontal lines attached to their extremities "toes." In view of these findings we are not justified, in the case of other subjects in whose drawings graphic differentiation is not clear, in relying upon naming as a criterion for distinguishing between upper and lower limbs and the parts composing each.

The drawing series yields further evidence of a lack of specificity in the graphic symbols. The verbal record shows clearly that a single graphic form may be intended to represent several parts of the body. This may be true even when the verbal symbols are clearly differentiated when applied to the child's own person.

With one exception all subjects correctly point out head, stomach, and legs on their own bodies and yet few drawings in the experimental series show even a partial differentiation of the trunk from both head and legs. The late appearance of the trunk in the developmental sequence has been observed by many writers. Partridge (21) and Goodenough (10) have given the frequency of its occurrence at the various age levels. Its appearance marks the turning point from partial to complete representation of the human figure in the developmental stages traced by Rouma (23).

It is customary to tabulate as head alone the circle which encloses the facial features and from which the legs extend in drawings of the "tadpole" stage. Luquet (17) has questioned the validity of this assumption and has proposed a division of these drawings into "true tadpoles" and "pseudo-tadpoles." In the former there is no indication that the circle is intended to represent more than head or the appendages more than legs. In the latter the trunk is "seen and intended" (17, p. 699) by the child within the circle or within the appendages.

Luquet points out numerous graphic clues which indicate the presence of the trunk. Placement of the facial features in the upper portion of the circle and the drawing of buttons or navel or penis in the lower portion suggest that trunk as well as head is represented by this single form. Attachment of the arms to the lines which appear to represent legs, placement of buttons in the space between the legs, enlargement of the lower portion of this space to form a skirt, indicate that both trunk and lower limbs are intended by these undifferentiated lines. A single example is cited in which the child's verbal explanation, "All that is the body," confirms the presence of the trunk within the lines commonly classified as legs alone (17, p. 699 and Fig. 10, p. 704). Luquet is unwilling to assume a trunk in all "tadpole" drawings. He classes as "true tadpoles" those in which there is neither graphic nor verbal clue to its presence. He suggests, however, that the small number of "pseudo-tadpoles" recorded in the literature "is perhaps due to our ignorance and especially to the insufficient use of the method of direct observation of the child while he is drawing" (17, p. 693).

Luquet (16, p. 133) had previously observed in the biographical study of his daughter Simonne that in drawings at the early age levels there was always some part which served as "substance," a base to which details were added. In the early drawings of a man the head served this role. When the child verbally analyzed her drawings the head was not mentioned; it stood for the entire man and was used as a point of attachment for the limbs and facial features. In his later discussion of "pseudo-tadpoles" Luquet points out the presence of the trunk within the head or within the legs but does not develop further his earlier suggestion of a graphic form which is not designated by the name of any part because it is intended to represent the whole man.

In the present study we find examples of both types of "pseudo-tadpoles." In S2-2 inclusion[28] of the trunk within the lower limbs is shown by designating the upper portion of these lines "clothes" and the lower portion "feet." In S5-1 both head and trunk[29] are indicated within the form called "man" by placement of the facial features in its upper portion. We find furthermore that in drawings less well developed than those of the "tadpole" stage, in which the lower limbs are not graphically differentiated from the head, a primitive oval may serve as head, trunk, and lower limbs. In S3-6 this threefold[30] division is indicated. The head is shown by placement of eyes in the upper portion. The central part is called "body" and the lower end "legs." In drawings still more primitive, in which the man is a single undifferentiatel form, this form may be verbally divided into parts. In S3-3 one side of the oval[31] is called "legs," the opposite side "eyes." The circle, though not verbally divided into parts in any single drawing, may in the course of a series of drawings by the same child be designated by the names of several parts of the body. In S15-2 the circle is named "head," in S15-4 "trunk." In view of the evidence from other subjects, who in a single drawing verbally divide the circle into parts, Subject 15's naming suggests that he also intends to represent more than head within the primitive circle.

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[28] See Figure 27.

The illustrations cited above are sufficient to show that a single graphic form may be intended to represent more than one part of the body. They offer justification for the hypothesis of a basal form which in the earliest drawings represents the whole man and at a later stage of development the residue of parts not graphically differentiated one from another. The several stages in the gradual differentiation of the basal form into parts which we have traced in drawings of the present study will be presented below. Verbal differentiation of a graphically undifferentiated scribble comprises the earliest stage, the "pseudo-tadpoles" discussed by Luquet a later stage.

Neither graphic clues nor the verbal record is sufficient to demonstrate the existence of a basal form in every drawing of the present study. In line with Luquet's insistence upon "true tadpoles" one may assume that in the absence of graphic or verbal clues to the contrary a single graphic form represents but one part. We find, however, that 13 of the 16 subjects give evidence of a basal form in at least one drawing. Inadequacy of the verbal response rather than change of intention may well explain those instances in which no clue to its presence is given. The hypothesis of basal form resolves many of those inconsistencies between visual appearance and naming noted above. We have, therefore, assumed that in all drawings of the present study there is some part which represents the residue of parts not given separate graphic representation. This part is tabulated as the basal. The specific criteria for determining this basal form are given below.

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[29] See Figure 10.
[30] See Figure 23.
[31] See Figure 20.

In tabulating the parts of the body represented in the drawing series we are interested to discover, not which parts are drawn with sufficient skill to be recognized apart from the child's naming, but which parts may be seen to be graphically distinguished one from another when the child explains his drawing. Any graphic symbol by which one part is distinguished from another, whether it be a two-dimensional form, a straight line, a dot, or a compact localized scribble, is considered a graphic representation of that part. The part of the body which the graphic symbol is intended to represent is determined by criteria based upon both visual appearance and naming. Information on the child's understanding of the verbal symbols for the various parts of the body, derived from tests other than the drawing series, and evidence in support of the hypothesis of basal form, found within the drawing series, have been used in the formulation of these criteria. One finds cases in which a part of the drawing is renamed by the subject in the course of the drawing process, because of a shift in orientation, a change of theme, an attempted erasure or mutilation of the drawing, or because the addition of new lines so changes the visual appearance of the whole as to suggest a new alignment of parts. In these instances each part is tabulated in accordance with the name assigned it at the time the drawing is most complete, at the time it best represents a man.

Basal form.

> That part which appears to represent the residue of parts not given a separate graphic form is tabulated as the basal. In "tadpole" drawings it is that part which serves as a base for the attachment of the limbs and the facial features.[89] It may be called "the man," or may be verbally differentiated into

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[89] See S8-1, line 1, Figure 7, and S7-2, line 1, Figure 2.

several parts, or may be called "head" or "face" or "body," or may remain unnamed or be called merely "a line." In drawings more primitive than the "tadpole," but in which there is both differentiation and synthesis of parts, the basal is that form[33] which is called "the man," or that encircling form which encloses all others,[34] or that central form about which others are[35] grouped. In drawings in which isolated forms, designated by the names of various parts of the body, are scattered about the page, the form called "the man" is recorded[36] as the basal. If none is so designated the part called "head" or "face" is arbitrarily taken to be the basal.[37]

Head.

The head is recorded as a part distinct from the basal form in those cases in which there is a partial or complete graphic differentiation between the form named "head" or "face" or "neck" and the form which serves as a base for the attachment of additional[38] parts. The head may be attached to the circumference of the basal[39] or placed within its borders.[40]

Trunk.

The trunk is recorded as a part distinct from the basal in those cases in which there is a partial or complete graphic differentiation between the form named "stomach," or "body," or "belly," or "trunk," or "shirt" and the form called "man," or, lacking this latter designation, the form which serves as a base for the attachment of additional parts. The trunk may be attached to the circumference[41] of the basal or placed within its borders.[42] The trunk is also recorded when a division is indicated within the basal by placement of the facial features in its upper portion.[43] This latter criterion is used only when the lower limbs are so drawn as to preserve the top-bottom relationship of the figure: if legs are placed above the facial features as well as below them[44] or if there is no differentiation of the lower limbs[45] the trunk is not recorded. The criterion is the same as that used in the Goodenough scale[46] except for the additional requirement concerning the limbs. In view of our finding that the lower portion of an elongated basal form may be verbally differentiated as the legs we have not scored it as representing the trunk unless the lower limbs have been given a separate graphic form.

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[33] See S11-1, lines 1 and 2, Figure 5.

[34] See S16-4, line 1, Figure 4.

[35] See S1-1, line 1, Figure 6.

[36] See S9-2, line 1, Figure 14.

[37] This arbitrary designation of the basal occurs in two drawings only, S1-2 and S1-3.

[38] In a single case, S14-9, in which head and both upper and lower limbs, well oriented one to another, are grouped about a central empty space this space is recorded as the basal and the head is tabulated as a separate form distinct from it. See Figure 29.

[39] See S12-9, line 1, Figure 9.

[40] See S11-1, line 3, Figure 5

[41] See S 1-1, line 3, Figure 6.

[42] See S8-7, line 10, Figure 7.

[43] See S5-1, Figure 10, and S5-3, Figure 11.

Limbs.

Any form differentiated from the basal which is named "leg"[47] or "foot"[48] or "toe" and which is not graphically divided into an upper and a lower section is tabulated as a lower limb, unless two or more such parts are drawn extending from opposite sides of the basal giving the visual appearance of arms. In this latter case they are tabulated as upper limbs misnamed. Any form differentiated from the basal which is named "arm"[49] or "hand"[50] or "fingers" and which is not graphically differentiated into an upper and a lower section is tabulated as an upper limb unless no lower limbs have been drawn. In this latter case, if two or more forms named "arms" or "hands" or "fingers" extend from the same side of the basal and are so oriented to the remainder of the figure as to give the visual appearance of legs they are tabulated as lower[51] limbs misnamed. If a lower limb is divided into an upper and a lower section either by shift in the direction of the line[52] or by the addition of a second form attached to its lower extremity[53]

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[44] See S7-2, Figure 2.

[45] See S3-4, Figure 22.

[46] "In cases where there is no clear differentiation between the head and the trunk, but the features appear in the upper end of a single figure, the point (i.e., the presence of the trunk) is scored plus if the features do not occupy more than half the length of the figure; otherwise the score is minus, unless a cross line has been drawn to indicate the termination of the head" (10, p. 92).

[47] See S5-3, lines 3 and 4, Figure 11.

[48] See S7-2, lines 2 to 5, Figure 2.

[49] See S5-1, lines 10 and 11, Figure 10.

[50] See S10-6, line 2, Figure 21.

[51] No such instances of confusion between upper and lower limbs were found in the drawing series. Confusions in the man completions determined the criteria used.

[52] See S1-6, lines 5 and 6, Figure 6.

[53] See S5-2, lines 5 to 9, Figure 10.

> the child is credited with having drawn lower limb and foot. Similarly if an upper limb is so divided into parts the child is scored as having drawn upper limb and hand.[54]

Facial and head features.

> When the child names the parts his verbal explanation is taken as the sole criterion for determining the differentiation of the facial and head features—eyes, nose, mouth, hair, and ears. Any distinct graphic symbol designated by the name of one of these features is considered a graphic representation of that part, whatever its location may be. If the child's verbal explanation is not secured a single unnamed graphic form placed inside the head or basal is tabulated as a representation of eyes. A configuration of forms is tabulated in accordance with the visual appearance of the parts.[55]

B. THE DIFFERENTIATION OF PARTS OF THE BODY IN THE DRAWING SERIES

When the parts of the body represented throughout the drawing series are tabulated in accordance with the criteria described above, the outstanding finding is the variability in the number of parts drawn, in the choice of parts, and in the temporal order of their representation. A comparison of group averages indicates that this variability is in large part independent of the special instructions and varying conditions operating in the several drawing situations.

1. *The Number of Parts Represented.*

Table 5 gives the data for each drawing of the series with the exception of Situation 8, the "Man on Dictation." Here conditions are such that the child makes a pencil mark of some sort in response to the examiner's request to draw each part in turn or else refuses to comply with the request. Under these conditions a crudely drawn symbol for the part requested cannot be distinguished from an obliging but meaningless scribble, unless the position of the pencil mark relative to other parts of the drawing gives it representative value. Differentiation cannot be measured apart from synthesis.

The conditions for the first six situations differ only in size of

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[54] See S8-7, lines 13 to 16, Figure 7. There were no cases in which a threefold division was made in the upper limb indicating the differentiation of arm, hand, and fingers.

[55] In S5-5, for example, lines 9 to 11, through unnamed, appear to be intended for eyes and mouth (Figure 12).

TABLE 5

THE PARTS OF THE BODY DIFFERENTIATED FROM THE BASAL FORM AND THE TEMPORAL ORDER IN WHICH THEY WERE DRAWN

Subjects	1								2								3								4							
Situations	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Parts drawn																																
None							x								x				x				x	x								
Basal form	1	1	1	2	1	2		1	1	1	1	1	1	1		1	2	1		1	1	1			1	1	1	1	1	1	1	2
Head																																
Trunk	3																															
Lower limbs	2			3	2	4		2	2	2	2	2	2	2		2	3								2	2	2	2	2	2	2	1
Feet					3	5																			3	3	3		3	3	3	3
Upper limbs		3	2																													
Hands																																
Eyes																	1	2		2	2	2										
Eye detail																																
Nose																																
Mouth												3																				
Hair				1		1																									4	
Ears	4	2																														
Chin						3																										
Hat				4																												

Subjects	5								6								7								8							
Situations	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Parts drawn																																
None							x	x	x	x	x	x	x	x		x																
Basal form	1	1	1	2	3	1									1		2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Head																	1		1			2										
Trunk	1		1			3																								4	6	
Lower limbs	3	3	2	1	1													2	3	2				2	5	5	5	4	4		7	3
Feet	4	4		3	2													3	4												8	
Upper limbs	5	6	4			2														4								5			9	
Hands																				5											10	
Eyes	2	5		4	4										2		3	4	5	3	2		2		2	2	2	2	2	2	5	2
Eye detail																															4	
Nose																									4	3	3	3		3		
Mouth					5																3				3	4	4		3	5		
Hair																															2	
Ears			3	5																											3	
Chin																																
Hat		2																											5			

Note: The numbers recorded for the parts indicate the temporal order of drawing.

TABLE 5 (*Continued*)

Subjects	9								10								11								12							
Situations	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Parts drawn																																
None			x						x	x	x	x	x		x	x			x	x	x		x		x	x	x	x	x	x	x	
Basal form	1	1		1	1	1	2	2						1			1	1				1		1								1
Head							1	1						4			2	2				2		3								
Trunk																																
Lower limbs														3								3		2								2
Feet																																
Upper limbs														2																		
Hands																																
Eyes	2	2		2	2	2								6																		
Eye detail																																
Nose														5																		
Mouth																																
Hair																																
Ears																																
Chin																																
Hat																																

Subjects	13								14								15								16							
Situations	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Parts drawn													0								0	0							0			
None				x		x																										
Basal form	x	1	1		1		1	3	1	x	3	1		1	3	x	1	1	1	x			x	x	2	2	1	1		1	1	2
Head								1								x										5				6		
Trunk								2				4		5																		
Lower limbs	x	5	6		2		2	4		x	1	5		1	1	x	2	2	2	x			x	x	1	1					6	1
Feet							3			x	2	6		2	2	x	5		5												7	
Upper limbs		7													4	x										4	3	4		5	5	
Hands		6													5	x																
Eyes	x	2	2		3		4	5	2	1	4	2		3	6	x	3	3	3	x			x	x	3	3	2	2		2	2	3
Eye detail									3																							
Nose	x	4	4		4			6																						4	3	4
Mouth	x	3	5		5			7	4		5	3		4	8	x	4	4	4									3		3	4	5
Hair			3									8			7												4			7		
Ears												7																				
Chin																																
Hat																																

Note: The numbers recorded for the parts indicate the temporal order of drawing. With Subjects 13, 14, and 15 this order was not recorded in all situations. In these cases an *x* indicates the parts drawn. Situation 5 was omitted in the case of Subjects 14, 15, and 16, Situation 6 in the case of Subject 15.

TABLE 6

NUMBER OF PARTS OF THE BODY REPRESENTED IN EACH SITUATION OF THE DRAWING SERIES

Situations	Subjects 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Avg. No. parts
1	4	2	3	3	6		3	5	2		2		5	4	5	3	2.9
2	3	2	2	3	6		4	5	2		2		7	4	4	5	3.1
3	2	2		3	5		5	5					6	5	5	4	2.6
4	4	3	2	2	5		5	5	2					8	3	4	2.7
5	3	2	2	3	5		3	5	2				5	x	x	x	2.3
6	5	2	2	3	3		2	5	2	6	3			6	x	7	3.1
7				4		2	2	10	2				4	8	3	7	2.6
9	2	2		3			2	3	2		3	2	7	8	3	5	2.6
Average Sits. 1-6	3.5	2.2	1.8	2.8	5.0		3.7	5.0	1.7	1.0	1.2		3.8	5.4	4.3	4.6	2.8
Average Entire series ..	2.9	1.9	1.4	3.0	3.8	0.3	3.3	5.4	1.8	0.8	1.3	0.3	4.3	6.1	3.8	5.0	2.8
Maximum in any situ'n	5	3	3	4	6	2	5	10	2	6	3	2	7	8	5	7	4.9
Minimum in any situ'n	0	0	0	2	0	0	2	3	0	0	0	0	0	4	3	3	1.1
Repertory Sits. 1-6	9	3	3	3	9	0	8	8	2	6	3	0	8	9	5	8	5.3
Repertory entire series ..	9	3	3	4	9	2	8	15	3	6	3	2	11	12	5	9	6.4

Average number of parts drawn in Situations 1 and 4, the "Man"	2.8
" " " " " " " 2 " 5, the "Little Man"	2.7
" " " " " " " 3 " 6, the "Big Man"	2.8
" " " " " " " 2 " 3, on small paper	2.9
" " " " " " " 5 " 6, on large paper	2.7
" " " " " " " 1, 2, 3, the first day	2.9
" " " " " " " 4, 5, 6, the second day	2.7

Note: An *x* indicates that the situation was omitted.

paper and in the instructions concerning the size of the drawing. No help is given by presenting a model or by suggesting parts. The average of these six situations and the variability within them may be taken as a norm for comparison of the special conditions of Situations 7 and 9.

The average norm is justified in view of the findings (Table 6) that the conditions pertaining to size did not affect the number of parts drawn. Change in the size of the paper resulted in an average variation of only .2 of a part. Change in the verbal instructions concerning size brought an average difference of no more than .1 of a part.

One might expect that the introduction of the man completion series at the end of the first sitting, by suggesting new parts to the child, would result in an increase in the number drawn at the second sitting. That this is not the case is shown by comparing Situations 4, 5, and 6 with the corresponding Situations 1, 2, and 3. The slight difference of .2 of a part is in favor of the first day.

Similarly the special conditions of Situations 7 and 9 might be expected to increase the number of parts drawn. The average for each of these situations is found to be identical with that for Situation 3 and falls .2 of a part below the average for the first six situations. Neither the opportunity to draw from copy in Situation 7 nor the direction of attention toward head and legs in Situation 9 affected the number of parts given separate graphic representation.

In contrast to this uniformity in the group average for the several situations there is a marked variability in the number of parts represented in the drawings of an individual. The maximum number of parts in a single drawing exceeds the minimum by 3 or more in the case of 69 per cent of the subjects, by 6 or more in the case of 25 per cent. The average minimum number of parts is but 22.4 per cent of the average maximum number. As shown above, this variability cannot be attributed to the special instructions or varying conditions operating in the several drawing situations.

2. *The Choice of Parts.*

The choice of parts as well as the number is highly variable. The child not only drops a part or adds one to his representation of a man, but he also substitutes new parts for those previously used. When the average number of parts represented in a single drawing is compared with the average number in the child's total repertory we find that the group represents in a single drawing only 43.8 per cent of the parts which are represented at some time during the series (Table 6). A comparison between total repertory and the maximum number of parts drawn at any one time shows that the average number of parts represented in whatever situation yields the maximum is 76.6 per cent of the average number in the total repertory.

In each situation throughout the series parts are drawn which have not previously been represented (Table 7). In Situation 6 after five trials in which no direct help is given by the examiner in suggesting body parts, the average number of new parts drawn is greater than that found in Situation 2. In the course of the entire series the average number of new parts used in the representation of a man exceeds the average number of parts drawn in the first trial or in any succeeding trial (Tables 6 and 7).

TABLE 7

NUMBER OF NEW PARTS OF THE BODY, NOT PREVIOUSLY DRAWN IN THE COURSE OF THE SERIES, REPRESENTED IN EACH DRAWING SITUATION

Situations in which new parts were drawn	Subjects 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Average Number new parts
2	1				1		2						2	2		2	.63
3					1								1			1	.19
4	2	1					2	1						3		1	.63
5	1				1		1	1						x	x	x	.31
6	1							1		6	1				x	1	.67
7				1		2		5	1				1	2		1	.81
9												2	2	1			.31
Series	5	1		1	3	2	5	8	1	6	1	2	6	8		6	3.40
Avg. number new parts Sits. 2 and 5, the "Little Man"																	.47
" " " " " 3 " 6, the "Big Man"																	.43
" " " " " 2 " 3, on small paper																	.41
" " " " " 5 " 6, on large paper																	.49

Note: An x indicates that the situation was omitted.

The conditions pertaining to size did not affect the number of new parts represented. The average for the "Little Man" exceeds that for the "Big Man" by only .04 of a part. Substitution of the large sheet of paper for the small resulted in an average difference of only .08 of a part.

Both the opportunity to draw from copy, in Situation 7, and the direction of attention toward head and legs, in Situation 9, appear to influence slightly the choice of parts, though not the total number of parts represented. The nature of the differences is of interest, though their magnitude is too small to be attributed with any degree of certainty to the special conditions operating in these situations. Situation 7 appears to facilitate the drawing of new parts (Table 7), while Situation 9 encourages the representation of the legs, the part showing the highest frequency throughout the series (Table 8).

TABLE 8

THE PERCENTAGES OF SUBJECTS WHO DRAW EACH PART OF THE BODY IN THE SEVERAL DRAWING SITUATIONS

	Situations											Increase or decrease Sits. 4-6
Parts drawn	1	2	3	4	5	6	7	9	Avg. 1-6	Avg. 1-3	Avg. 4-6	compared with Sits. 1-3
Lower limbs	56	56	50	50	46	40	38	69	49.7	54.0	45.3	—8.7
Eyes	56	56	38	50	46	40	44	31	47.7	50.0	45.3	—4.7
Mouth	25	19	25	19	31	20	13	19	23.2	23.0	23.3	+0.3
Feet	19	25	25	13	23	20	31	13	20.8	23.0	18.7	—4.3
Upper limbs	6	25	19	19		20	19	6	14.8	16.7	13.0	—3.7
Nose	13	13	13	6	8	20	6	13	12.2	13.0	11.3	—1.7
Head	13	13	6			27	6	25	9.8	10.7	9.0	—1.7
											Average	—3.5
Trunk	13		6	6		20	6	6	7.5	6.3	8.7	+2.4
Hair			13	13		13	19		6.5	4.3	8.7	+4.4
Ears	6	6	6	13			6		5.2	6.0	4.3	—1.7
Hat		6		6	8				3.3	2.0	4.7	+2.7
Hands		6		6			13	6	2.0	2.0	2.0	=
Chin						7			1.2		2.3	+2.3
Eye detail	6						6		1.0	2.0		—2.0
											Average	+1.2

Of the 12 parts which compose the graphic model presented in Situation 7, eight is the maximum number previously drawn by any one of the subjects. The situation thus offers a potential visual suggestion of four or more new parts to include in the representation of a man. In Situation 9 the examiner's verbal description directs attention toward two parts only, the head and legs, and of these parts 88 per cent of the subjects have previously drawn one and 25 per cent have drawn both. The average number of new parts added in Situation 9 is within the range for the first six situations, while that for Situation 7 exceeds that found in any other situation. This excess may well be the result of the greater number suggested by the conditions imposed.

A greater percentage of subjects represent the lower limbs in the "Man from Description" than in any other situation (Table 8). This occurs in spite of a general downward trend in the number who drew this part within the first seven situations. The suggestion relating to the head, however, fails to increase its frequency as a part distinct from the basal. In Situation 9 the verbal as well as the graphic record reveals a greater interest in the legs than in the head. Of the 12 subjects who do not draw the head as a part distinct from the basal only three verbally designate as head some segment of the drawing. Of the five subjects who fail to draw the lower limbs, three point out as legs a part of the basal or a part of the undifferentiated scribble which serves to represent the man, and a fourth enquires whether this funny man can walk. The difference may be interpreted in terms of the degree of readiness for the differentiation of these parts in the child's spontaneous drawings. In the course of the series the head is seldom drawn as a part distinct from the basal, whereas the lower limbs show the highest frequency of any body part.

When the various parts of the body are arranged in rank order according to their frequency of occurrence within the first six situations and then compared as to their increase or decrease in the course of the series, we find a slight tendency for the more frequent parts to decrease in number as the series advances while the less frequent parts increase in number (Table 8).

Goodenough (10, p. 75) has suggested that the frequency of occurrence of any characteristic in a child's drawings at a given time is a measure of the degree to which that characteristic has become integrated into the child's developing concept of the object represented. Those elements which have become an integral part of his concept will be drawn invariably, those elements which are in process of integration will appear with more or less irregularity. If we take the relative frequency of occurrence of the various parts of the body in Situations 1 to 6 as a measure of the relative degree to which they have become an integral part of the child's concept of a man the results shown in Table 8 may be interpreted as indicating a decrease in the more stable elements and an increase in the less stable elements as the series progresses. The wide variability in the choice of parts is evidence that none are sufficiently stable to appear invariably at this age level.

3. *The Temporal Order in Which the Parts are Drawn.*

Variability both in the number and in the choice of parts represented in a single drawing makes it difficult to determine the amount of variability in the temporal order in which the parts are represented during the construction of a drawing. Relative order may remain constant even though absolute order varies. In the case of Subject 1 (Table 5) the hair, if represented at all, is always drawn first and is followed by the basal form. If the hair is not represented the basal form comes first. The lower limbs invariably follow hair, basal, and chin, and precede feet, trunk, ears, and hat, whenever these parts are represented. The position of the lower limbs relative to other parts remains constant throughout the series, although the absolute position of this part in the temporal pattern of a single drawing may be second, third, or fourth.

On the basis of evidence from the entire series, each child's total repertory of parts has been arranged in that temporal order from which the fewest deviations occur in the course of the series. This arrangement is assumed to be the customary order for that child (Table 9).

There is wide variability between subjects in the customary order. The lower limbs may be drawn before or after the basal, before or after the upper limbs. The head, when represented as a part distinct from the basal, may follow or precede it. The facial and head features may be grouped together before or after the lower limbs or may be scattered throughout the temporal sequence.

Individual differences are more marked than are differences within the drawings of an individual, but many of the variations noted between subjects occur within the drawings of an individual as deviations from his customary order. Fifty-six per cent of the subjects show at least one deviation from their own customary temporal order, and 19 per cent show as many as three deviations in the course of the series.

In a few studies the temporal order of drawing the parts has been reported. Rouma (23, pp. 189-90) states that the usual sequence is head, trunk (if present), legs, and arms, but deviations from this "logical" order are frequent, especially among children 3 to 4 years of age who have not yet had school experience. Lukens (15, p. 82) has given the temporal order in two drawings at the same sitting by a child of 56 months. There is variability in the sequence of parts as

TABLE 9

THE CUSTOMARY TEMPORAL ORDER USED BY EACH SUBJECT IN DRAWING THE VARIOUS PARTS OF THE BODY, AND DEVIATIONS FROM THIS ORDER SHOWN IN THE COURSE OF THE SERIES

Subject	Customary temporal order															Situation	Deviations from the customary order in the course of the series
	Basal form	Head	Trunk	Lower limbs	Feet	Upper limbs	Hands	Eyes	Eye detail	Nose	Mouth	Hair	Ears	Chin	Hat		
1	2		6	4	5	8						1	7	3	9		
2	1			2							3						
3	1			3				2								1	Eyes precede basal
4	1			2	3							4				9	Lower limbs precede basal
5	1		9	3	4	8		5			6		7		2	1	Eyes precede lower limbs
																4	Lower limbs precede basal
																5	Lower limbs and feet precede basal
6	1							2									
7	2	1		3	4	7	8	5			6					6	Basal precedes head
8	1		7	9	10	11	12	5	4	6	8	2	3		13	1	Mouth precedes nose
9	2	1						3									
10	1	4		3		2		6		5							
11	1	2		3												9	Lower limbs precede head
12	1			2													
13	3	1	2	4	5	11	10	6		8	9	7				2	Facial features precede lower limbs; mouth precedes nose
																3	Facial features precede lower limbs
14	3	?	9	1	2	4	5	6	7		8	11	10			2	Eyes precede lower limbs
																4	Lower limbs and feet follow trunk
																7	Hair precedes mouth
15	1			2	5			3			4						
16	3	8		1	2	7		4		5	6	9				6	Mouth precedes nose
																7	Lower limbs and feet follow upper limbs

well as in their number, and both drawings show deviations from Rouma's "logical" order. Among our group of four-year-old children we find an absence of any uniform order followed by the group, and frequent deviations within the drawings of an individual from his own customary sequence.

The foregoing analysis has shown a wide variability within the drawings of an individual, variability in the number of parts drawn, in the choice of parts, and, to a lesser degree, in the temporal order of their representation. Apart from an increase in the number of new parts represented in Situation 7 and an increase in the frequency of occurrence of the lower limbs as a part distinct from the basal in Situation 9, the special instructions and varying conditions appear to have had no effect upon the number or the choice of parts. Any possible effect upon temporal order is masked by the wide variability in number and in choice of parts. The significance of this variability will be discussed after further analysis of the findings.

C. The Synthesis of Parts of the Body in the Drawing Series

Because of the small number of parts given separate graphic respresentation and the wide variability in the choice of parts within the drawings of an individual, there are few drawings upon which to base a measure of the spacial relationships between parts. Although the data are inadequate to permit an evaluation of the effect of the different drawing situations upon this factor of synthesis, it is of interest to note the relative frequency of various misplacements throughout the series.

Three types of relationship between part and whole are essential to representative drawing. If the nose is correctly placed in the pictured man the child has stated in graphic language that (*a*) a man has a nose, (*b*) which is attached to the head, and (*c*) is placed below the eyes and above the mouth. The first statement may be termed the differentiation of part from whole, the second the attachment of that part, and the third its orientation within a configuration of several parts.

Attachment may be correct but orientation faulty: In S13-9 all[55] facial features are drawn inside the head but are placed in jumbled orientation one to another. Orientation may be correct within a small configuration but incorrect relative to other parts of the drawing: In S8-2 the facial features[56] are well oriented one to another, but incorrectly placed relative to the legs. In the early period of representative drawing when few parts are differentiated and misplacements are numerous, a statement of the number of parts which maintain a top-bottom relationship is a more accurate measure of orientation than is a decision as to which parts are misplaced within a jumbled whole. The top-bottom relationship refers to the vertical orientation of parts within the total figure irrespective of the direction of the figure upon the page. This mutual orientation may be well indicated even among isolated parts. In S12-8 the[57] "stomach" is midway between "head" and "legs" but distant from each by several inches. The "ears" are well placed on either side of the head but are separated from the latter by a space as great as the diameter of the head. In a few drawings there is no suggestion of synthesis. In S9-2 the circle[58] named "Man" is surrounded by discrete circles, "Eyes—little eyes—all kinds of eyes." Neither the joining of the parts nor their mutual orientation creates a whole from this configuration of isolated forms.

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[55] Figure 13.

Because of verbal confusion in distinguishing the parts which compose the limbs, feet and hands have been omitted from the analysis. In determining the differentiation of parts division of a limb into upper and lower sections was the criterion used for recording the presence of feet and hands.[59] No further measure of synthesis is justified.

The following criteria have been used in recording the attachment and the orientation of parts:

1. *Attachment of the parts.*

   a. Facial and head features.

   Requirement: If the head is drawn as a part distinct from the basal, the facial and head features—eyes, nose, mouth, ears, and hair—must be attached to the head. If the head is not so drawn they must be attached to the basal. Each feature is scored separately, but if two or more of a kind are drawn, such as two eyes, these must all be correctly attached in order

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[56] Figure 13.
[57] Figure 14.
[58] Figure 14.
[59] See above.

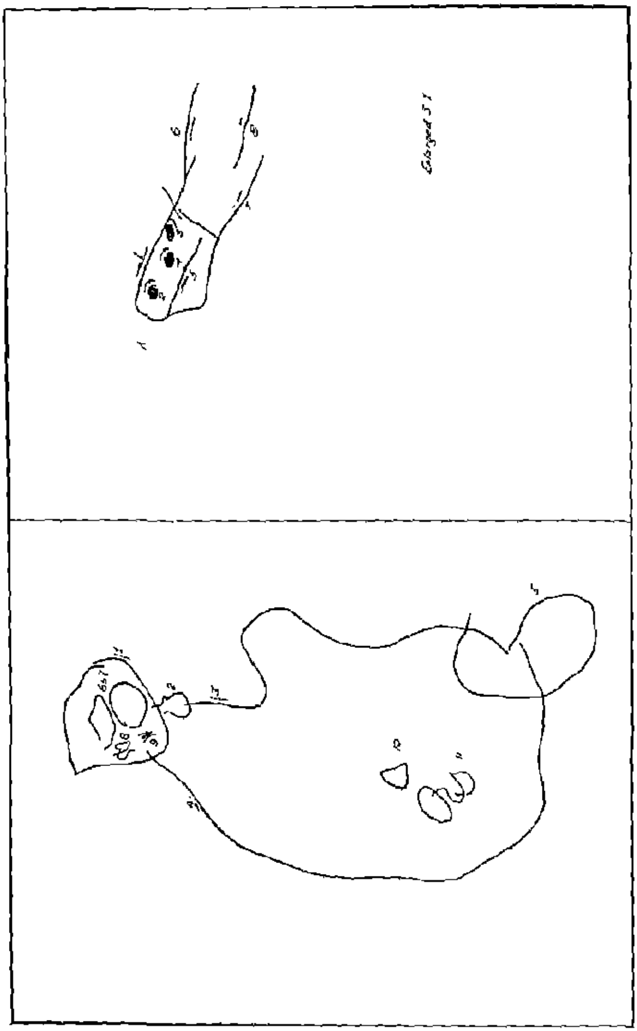
Enlarged 5 1

FIGURE 13

SUBJECT 13

(*Left*)

Situation 9: *Man from Description.* 2nd Day.
Record of Drawing:

Lines 1-11
Q. 3-4 "Legs."
Q. 6-7 "Eyes."
Q. 8 "Nose."
Q. 9 "Mouth."
Q. 10 "Button."
Q. 11 "Button."
At completion *E* asked what he had made. "Dog."

SUBJECT 8

(*Right*)

Situation 2: *Little Man.* 1st Day.
Record of Drawing:

Line 1 "There's a man."
Lines 2-5 Stops as if finished.
Then says, "I'll make his legs."
Paper slips, rotating 45 degrees clockwise; *A* becomes top.
Lines 6-8

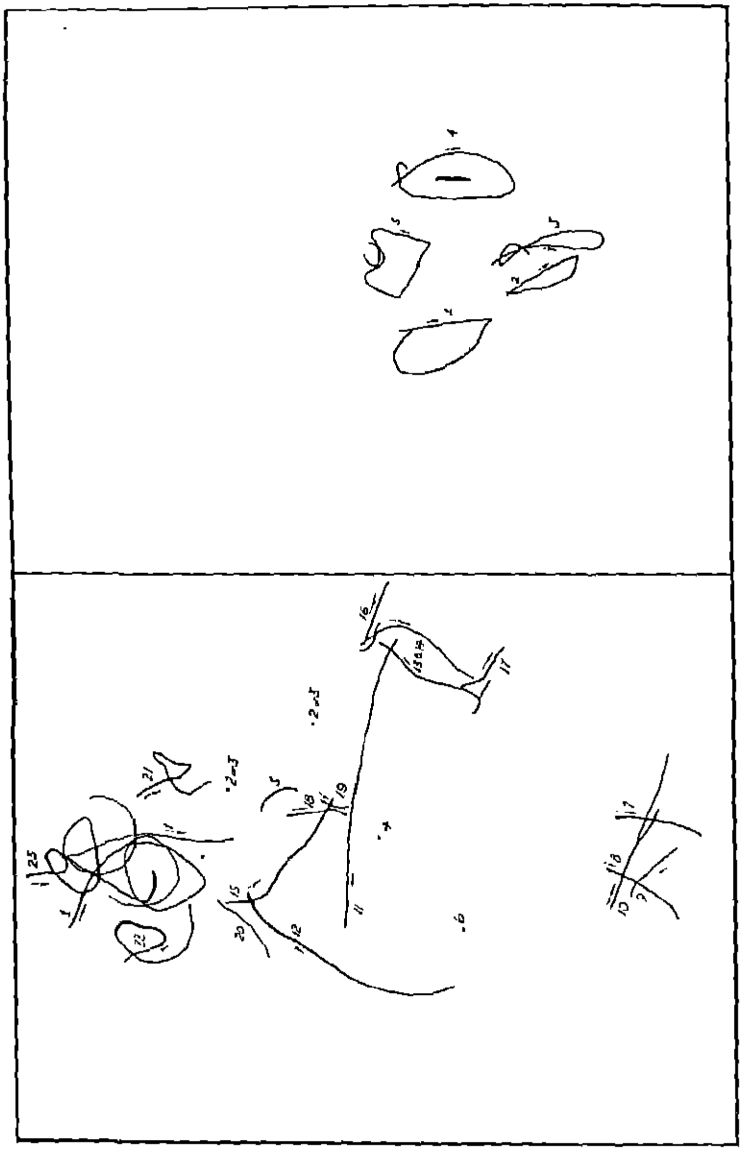
13&14
2-3
2-3

FIGURE 14

SUBJECT 12

(*Left*)

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Line 1, after repeated urging.
Eyes	Lines 2-3 (2 dots)
Nose	Line 4
Mouth	Line 5
Stomach	Line 6
Legs	Lines 7-8
Feet	Lines 9-10
Toes	"He have got some."
Arms	Lines 11-12
Hands	Lines 13-14, then 15
Fingers	Lines 16-17 (2 strokes each)
	Lines 18-20
Ears	"I did . . . it's inside here," pointing within head circle, "but his ears is broke."
	E urges her to give the man "some good ears that aren't broken."
	Lines 21-22
Hair	Line 23

Child's interest grew markedly as drawing progressed, and hair was drawn with evident pleasure.

SUBJECT 9

(*Right*)

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

Line 1	"That's the little man."
Line 2	"There's man."
Line 3	"Little eyes."
Line 4	"I can make that kind, too. These are all eyes."
Line 5	

E. "Where is the little man?"

Points to 2.

Q. 1, 3, 4, 5 "Eyes . . . all kinds of eyes."

to score. If, for example, one eye is placed inside and a second outside the head, attachment is not considered correct.

b. Trunk and head.

Requirement: The trunk and head, if drawn as parts distinct from the basal, must be placed within its borders or attached to its circumference. When the trunk is represented as the lower portion of an elongated basal form its attachment is considered correct.

c. Lower and upper limbs.

Requirement: The lower limbs must be attached to the basal or to the trunk, the upper limbs to the basal, the trunk, or the lower limbs. Upper and lower limbs are scored separately but all of a kind must be correctly placed in order to score.

2. *Orientation of the Parts.*

a. Orientation of the facial features one to another.

Requirement: Eyes, nose, and mouth must all be present. The eyes must be in a horizontal line, the nose below them in the mid-line, and the mouth centered below the nose. The term "below" is understood to designate a top-bottom relationship between the facial features only, irrespective of their orientation relative to the entire figure. They may be placed outside the head or basal or apart from the entire figure, provided only that their orientation one to another is correct.

b. Vertical orientation of three parts.

Requirement: A correct top-bottom relationship must be maintained between any three of the following four parts: head (or basal), trunk (or basal), lower limbs, and facial features. Any one of the four parts may be absent or misplaced. Two facial features are sufficient to determine the orientation of this part within the configuration, or eyes alone are sufficient, provided they are placed in the upper half of the head or basal. Placement of the trunk between the lower limbs, which are attached to the head or basal rather than to the trunk, is considered a correct vertical orientation of three parts. Placement of the trunk inside the basal below the configuration of the facial features is considered a correct vertical orientation of three parts.

c. Vertical orientation of four parts.

Requirement: A correct top-bottom relationship must be maintained among all four of the following parts: head (or basal), trunk (or basal), lower limbs, and facial features.

d. Orientation of the upper limbs.

Requirement: If the upper limbs are attached to the basal they must be placed below the head or facial features. If they are attached to the trunk they must be placed in its upper or central portion above the legs: if attached to the legs they must be placed in the upper half of this part. In drawings in which an empty space intervenes between basal and legs, placement of the upper limbs in this trunk area is considered correct orientation.

e. Orientation of the ears.

Requirement: The ears must be placed near the mid-region of the head (or basal) as judged by the vertical orientation of the entire figure. They may extend from its circumference or be placed within its borders near the circumference. If two are drawn they must be on opposite sides of the head (or basal).

The relationship between the number of subjects who draw the parts necessary to determine synthesis and the number who correctly synthesize these parts, as judged by adherence to the above criteria, is given in Table 10. This relationship cannot be shown for the "Man on Dictation," since the conditions imposed in Situation 8 preclude the measurement of differentiation apart from synthesis.[90]

In the attachment of parts the percentage of subjects who achieve correct synthesis is consistently high and the variability between situations is slight. In the orientation of parts this variability is greater than that found in the attachment of parts, but the drawings upon which the figures are based are too few in number to attribute the differences to the special conditions operative in the different drawing situations. In the entire series there are only 12 drawings in which all three facial features are represented, and only 9 in which differentiation is adequate to determine the vertical orientation of four parts of the body. The finding of chief interest is the small number of subjects who achieve correct orientation within a configuration of parts as compared with those who attach the individual parts correctly.

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[90] See above.

TABLE 10

THE PERCENTAGE OF SUBJECTS WHO CORRECTLY SYNTHESIZE THE PARTS OF THE BODY REPRESENTED

Parts of the body drawn	Number of subjects who draw the parts necessary to determine synthesis Situations								Percentage of subjects, among those who draw the necessary parts, who synthesize them correctly Situations								Avg. entire series
	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	
A. Attachment of parts																	
Eyes	9	9	6	8	6	6	7	5	100	78	100	88	100	67	100	100	92
Nose	2	2	2	1	1	3	1	2	100	100	100	100	100	33	100	100	92
Mouth	4	3	4	3	+	3	2	3	100	100	100	67	100	67	100	100	92
Trunk	2		1	1		3	1	1	100		100	100		67	100	100	95
Lower limbs	9	9	8	8	6	6	6	11	100	100	100	88	100	100	100	82	96
Upper limbs	1	4	3	3		3	3	1	100	100	67	100		100	100	0	81
Ears	1	1	1	2			1		0	0	100	100			100		60
Hair			2	2		2	3				100	100		100	100		100
Head	2	2	1			+	1	+	100	100	100			100	0	50	75
Average									88	83	96	93	100	79	89	76	87
Avg. % *S*'s who correctly attach the parts in Sits. 1 and 4, the "Man"																	91
Avg. % *S*'s who correctly attach the parts in Sits. 2 and 5, the "Little Man"																	92
Avg. % *S*'s who correctly attach the parts in Sits. 3 and 6, the "Big Man"																	88
Avg. % *S*'s who correctly attach the parts in Sits. 2 and 3, on small paper																	90
Avg. % *S*'s who correctly attach the parts in Sits. 5 and 6, on large paper																	90
Avg. % *S*'s who correctly attach the parts in Sits. 1, 2, 3, the first day																	89
Avg. % *S*'s who correctly attach the parts in Sits. 4, 5, 6, the *second* day																	91
B. Orientation of parts																	
Facial features	2	2	2		1	2	1	2	100	50	100		100	50	100	0	83
Vertical, 3 parts	8	7	6	5	3	5	5	6	50	57	83	80	100	60	80	50	70
Vertical, + parts	1	1	1	1		2	1	2	0	0	0	100		50	100	50	43
Upper limbs	1	3	2	3		2	3	1	0	33	0	55		100	33	100	43
Ears	1	1	1	2			1		0	0	0	50			100		30
Average									30	28	37	66	100	65	83	50	54
Avg. % *S*'s who correctly orient the parts in Sits. 1 and 4, the "Man"																	48
Avg. % *S*'s who correctly orient the parts in Sits. 2 and 5, the "Little Man"																	64
Avg. % *S*'s who correctly orient the parts in Sits. 3 and 6, the "Big Man"																	51
Avg. % *S*'s who correctly orient the parts in Sits. 2 and 3, on small paper																	33
Avg. % *S*'s who correctly orient the parts in Sits. 5 and 6, on large paper																	83
Avg. % *S*'s who correctly orient the parts in Sits. 1, 2, 3, the first day																	32
Avg. % *S*'s who correctly orient the parts in Sits. 4, 5, 6, the second day																	[illegible]

In the synthesis of parts as well as in their differentiation there is variability within the drawings of an individual. On the average 18 per cent of those who draw a part more than once show both correct and incorrect attachment of that part and 61 per cent of those who repeat a given configuration of parts show both correct and incorrect orientation within the configuration (Table 11).

TABLE 11

VARIABILITY WITHIN THE INDIVIDUAL IN THE SYNTHESIS OF PARTS OF THE BODY

Parts of the body drawn	Number of subjects who draw the parts more than once	Number of subjects who synthesize the parts correctly in at least one drawing and incorrectly in at least one drawing	% of those subjects who draw the parts more than once who show both correct and incorrect synthesis
A. Attachment			
Eyes	9	2	22
Nose	3	1	33
Mouth	5	1	20
Trunk	3	1	33
Lower limbs	11	2	18
Upper limbs	5	2	40
Ears	2	0	0
Hair	3	0	0
Head	4	0	0
		Average	18%
B. Orientation			
Facial features	3	2	66
Vertical, 3 parts	8	7	88
Vertical, 4 parts	1	1	100
Upper limbs	4	2	50
Ears	2	0	0
		Average	61%

The findings that both the frequency of error for the group and the variability within the drawings of an individual are higher in the orientation of parts than in the attachment of parts may be interpreted in the light of Luquet's (17, p. 701) statement that "relations of inclusion" (the attachment of parts) are correctly understood and graphically represented at an earlier age than "relations of juxtaposition" (the orientation of parts). Our figures indicate that at 4 years of age the more recently acquired factor of orientation is less stable, as regards both the frequency of error within the group and variability within the individual, than is the factor of attachment, genetically older and therefore more thoroughly integrated into the child's developing concept of a man.

Both casual inspection of the drawings and the mental age rating obtained by the Goodenough scale[61] show clearly that the representative value of the drawings obtained in Situation 8 exceeds that of any other situation. As previously shown the conditions imposed in the "Man on Dictation" preclude the measurement of the differentiation and synthesis of parts as separate factors in the graphic representation of the human figure. Only if a pencil mark, which follows the examiner's request to draw a given part of the body, is placed with approximate accuracy relative to previous marks, can one be certain that the child's response is truly an effort to represent the part called for and not an obliging but meaningless scribble. The superiority of Situation 8 can best be expressed by a joint measure of differentiation and synthesis.

The percentage of subjects who show correct attachment and orientation of the parts is given in Table 12. Percentages are based upon all drawings in which the necessary differentiation was possible, in Situation 8 upon all drawings in which the parts in question were called for by the examiner, in other situations upon the total of the drawings secured. In addition to the figures for each of the nine situations a composite measure, indicated by *C*, shows the presence of correct synthesis in at least one of the first six situations.

Certain difficulties arise in recording correct synthesis in Situation 8. A distinction must be made between anticipation of the examiner's request and failure to differentiate two parts. If the child draws a circle, when requested to make the head, then immediately adds the conventional leg lines, and later, when asked to draw the legs, points to these lines saying, "I did," he is credited with having drawn both parts. If, however, he draws a circle when the head is called for and later, when asked to make the legs, points to a segment of this circle, he is not credited with the representation of legs.

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[61] See Table 15.

TABLE 12

THE PERCENTAGE OF SUBJECTS WHO DIFFERENTIATE AND CORRECTLY SYNTHESIZE THE PARTS OF THE BODY IN EACH OF THE NINE DRAWING SITUATIONS

	Situations									
Parts of the body drawn	1	2	3	4	5	6	7	8	9	C
A. Attachment of parts										
Eyes	56	44	38	44	46	27	44	81	31	56
Nose	13	13	13	6	8	7	6	81	13	13
Mouth	25	19	25	13	31	13	13	75	19	44
Trunk	13	0	6	6	0	13	6	50	6	25
Lower limbs	56	56	50	44	46	40	38	75	56	81
Upper limbs	6	25	13	19	0	20	19	75	0	44
Ears	0	0	6	13	0	0	6	47	0	13
Hair	0	0	13	13	0	13	19	47	0	25
Average	21	20	21	20	16	17	19	66	16	38
Average in Sits. 1 and 4, the "Man"										21
Average in Sits. 2 and 5, the "Little Man"										18
Average in Sits. 3 and 6, the "Big Man"										19
Average in Sits. 2 and 3, on small paper										21
Average in Sits. 5 and 6, on large paper										17
Average in Sits. 1, 2, 3, the first day										21
Average in Sits. 4, 5, 6, the second day										18
B. Orientation of parts										
Facial features	13	6	13	0	8	7	6	31	0	13
Vertical, 3 parts	25	25	31	25	23	20	25	50	19	63
Vertical, 4 parts	0	0	0	6	0	7	6	19	6	6
Upper limbs	0	6	0	6	0	13	6	25	6	19
Ears	0	0	0	6	0	0	6	40	0	6
Average	8	7	9	9	6	9	10	33	6	21
Average in Sits. 1 and 4, the "Man"										9
Average in Sits. 2 and 5, the "Little Man"										7
Average in Sits. 3 and 6, the "Big Man"										9
Average in Sits. 2 and 3, on small paper										8
Average in Sits. 5 and 6, on large paper										8
Average in Sits. 1, 2, 3, the first day										8
Average in Sits. 4, 5, 6, the second day										8

Note: *C* indicates differentiation and correct synthesis in at least one of the first six situations. Percentages are computed on the basis of all drawings in which the necessary differentiation of parts was possible. In Situation 8 *E* failed to request Subject 13 to draw ears and Subject 15 to draw hair. Situation 5 was presented to 13 subjects, Situation 6 to 15 subjects. In all other situations the percentages are computed on the basis of 16 drawings.

A further difficulty is found in the fact that the conditions in Situation 8 preclude the recording of a basal form. It will be shown that the part drawn in response to the request to make the head may assume the rôle of the basal as the drawing progresses, but at the moment of drawing it presumably represents the head alone. The criterion used for recording the attachment of the head when drawn as a part distinct from the basal is thus not applicable to the "Man on Dictation." This point has, therefore, been omitted in the joint measure of differentiation and synthesis. In applying to Situation 8 all other of the criteria used for the measurement of synthesis the term "head" may be substituted for "basal," and "stomach" for "trunk."

In Situation 8 a larger percentage of subjects differentiate and correctly synthesize each part and each configuration of parts measured than is the case in any other situation. Furthermore, with the exception of the attachment of the lower limbs and the vertical orientation of three parts, Situation 8 exceeds the composite measure from the first six situations. The "Man on Dictation" is not only superior to all other drawings but it combines the best features in a series of six, and part by part exceeds the composite measure from these six drawings.

It will be shown that the average mental age equivalent of the drawings in Situation 8 exceeds that found in any other situation by 4.5 months and exceeds the average of the remaining eight situations by 6.7 months. The "Man on Dictation" simulates the spontaneous work of older children not because the quality of the performance is superior to that found in other drawings of the series, or the parts of the body represented are different, or errors in the synthesis of parts are absent, but because the performance is more complete. In spontaneous drawings at this age the span of attention is exhausted after the graphic recording of only a small number of those characteristics which together form the child's concept of a man. Conditions imposed in Situation 8 make possible, by the reenforcement of attention, a more complete expression of this concept.[92]

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[92] Comparison of S14-8, Figure 15, with S14-1 and 3, Figure 3, illustrates the enlargement of the graphic pattern which results from the conditions imposed in the "Man on Dictation."

FIGURE 15

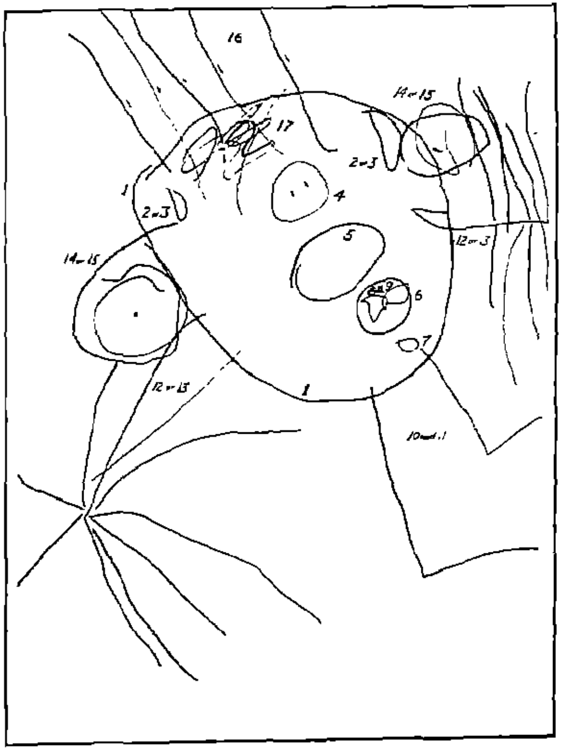
(*Right*)

SUBJECT 14

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Line 1
Eyes	Lines 2-3
Nose	Line 4
Mouth	Line 5
Stomach	Line 6 "Belly"
	Line 7 "Body"
	Lines 8-9 (within line 6) "Body . . . Belly"
Legs	Lines 10-11
Arms	Lines 12-13 (immediately added finger lines, 9 radiating from line 12 and 9 from line 13)
Ears	Lines 14-15 (each consisting of two circles and inner dot)
Feet	Pointed to extremities of lines 10 and 11.
Hands	Pointed to lines radiating from lines 12 and 13.
Hair	Line 16 (5 strokes)
	Line 17 (scribble) "Hair on his forehead."



D. THE ORIENTATION OF THE DRAWING TO THE CHILD

Closely associated with errors in the orientation of parts within the whole are those shifts in the orientation of the total figure relative to the child which occur during the drawing process. An apparently unintentional and unobserved rotation of the paper during construction of the drawing may result in a faulty orientation of parts within the whole, or, conversely, rotation of the sheet may serve as a means of correcting a previously unobserved error in the mutual orientation of parts.

The former mechanism is found[93] in S8-2. After drawing the basal and the facial features, well oriented one to another and placed in the conventional top-bottom relationship upon the page, the child rotates the paper 45 degrees clockwise, apparently by chance. She then continues the drawing in this new orientation, extending the legs downward from the basal, judged in relation to the child, but in a horizontal line to the right of the basal, judged in relation to the position of the facial features. The reverse mechanism is found[94] in S5-2. After construction of the basal form, two lines called "arms" are extended horizontally to the left, two more termed "legs" are drawn to the right. The sheet is then rotated 90 degrees clockwise. A second pair of "arms," well placed in relation to the legs, are added and the lines previously intended for arms are triumphantly renamed "a hat."

All shifts of 45 degrees or more in the position of the paper relative to the child are listed in Table 13. The method of recording these shifts has been described. It will be recalled that the position of the child at the beginning of each drawing situation is kept constant, but full freedom of movement is permitted during construction of the figure, provided only that the paper remains flat upon the table top. A shift in orientation may be accomplished either by rotation of the paper or by walking around the table and drawing from a new angle. Shifts occuring before the first stroke is made or after completion of the drawing are not entered in the table.

These variations in orientation appear to be unrelated to the construction of any specific part of the body. They were made before, during, or after the drawing of the basal, before or after the

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[93] See Figure 13.

[94] See Figure 10.

TABLE 13
FREQUENCY OF SHIFTS IN THE POSITION OF THE PAPER RELATIVE TO THE CHILD ARRANGED ACCORDING TO THE SUGGESTED CAUSAL FACTOR

Suggested causal factors	Situations 1	2	3	4	5	6	7	8	9	No. of drawings	% of drawings
Inadequate motor control		1		1		1				3	2
Change of theme						1				1	1
Dissatisfaction with the drawing	1			1			1			3	2
An error in the mutual orientation of parts		1								1	1
Deviation from conventional position of figure upon page	1		1							2	1
Exploratory manipulation of the paper	3		1	1	2		1			8	6
Number of drawings in which a shift occurs	5	2	2	3	2	2	2	0	0	18	
Percentage of drawings in which a shift occurs	31	13	13	19	15	13	13	0	0		13

Average percentage of drawings, Sits. 1 and 4, the "Man"	25
Average percentage of drawings, Sits. 2 and 5, "Little Man"	14
Average percentage of drawings, Sits. 3 and 6, "Big Man"	13
Average percentage of drawings, Sits. 2 and 3, small paper	13
Average percentage of drawings, Sits. 5 and 6, large paper	14
Average percentage of drawings, Sits. 1, 2, 3, 1st day	19
Average percentage of drawings, Sits. 4, 5, 6, 2nd day	16

representation of facial and head features, of lower and upper limbs. Shifts occurred in only 13 per cent of all drawings but 63 per cent of the subjects changed the orientation of the paper relative to themselves in at least one drawing of the series.

Observation of the drawing process suggests that one or more of the following factors may operate to produce a shift in orientation:

1. *Inadequate Motor Control.*

a. The child's inept pressure of pencil on paper may result in an unintentional rotation of the page as the line is drawn.[65]

b. A careless movement may cause rotation between strokes and

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[65] See S7-4, Figure 16.

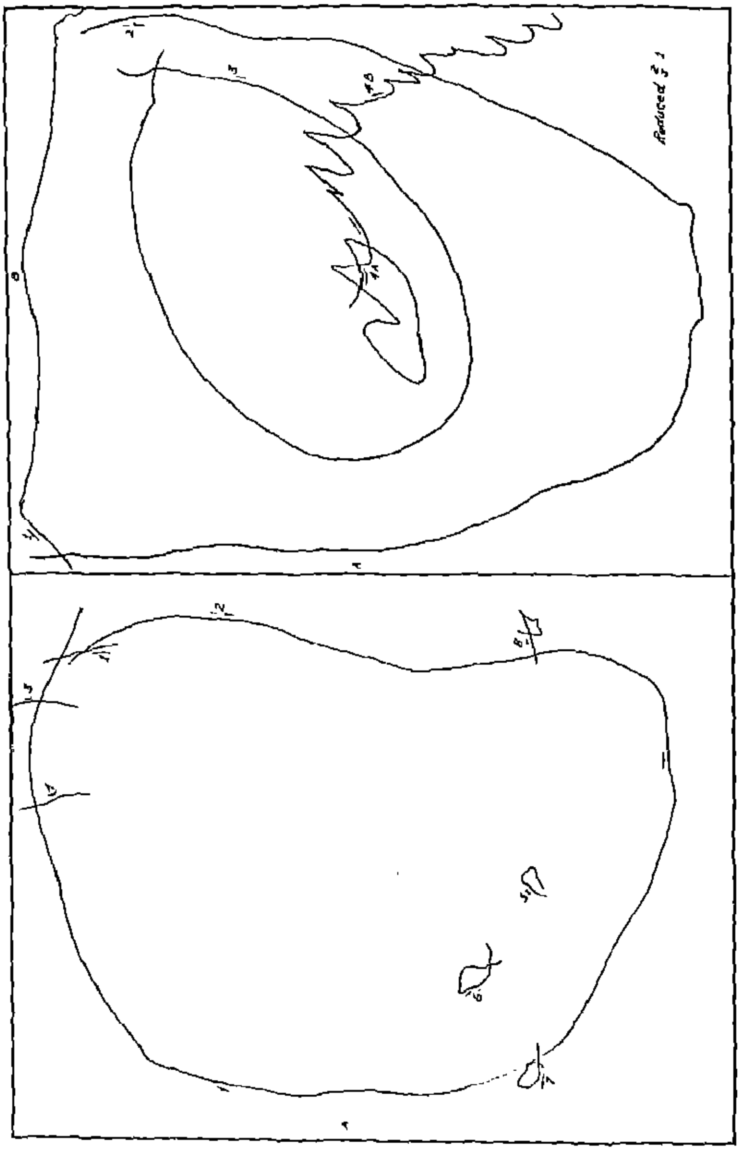
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FIGURE 16

SUBJECT 7

(*Left*)

Situation 4: *Man.* 2nd Day.

Record of Drawing:

Lines 1-2 As line 2 is drawn page rotates 90 degrees clockwise, slipping under pressure of pencil; *A* becomes top.

Lines 3-4

Lines 5-6 "There him eye."

Line 7 "There him hand."

Line 8

Q. 8 "Him hand, too."

Q. 2 "He needs a head."

(*Right*)

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

Before starting to draw walks around table 90 degrees to right so that *A* becomes top.

Lines 1-2 "No eyes . . . I make a lamp."

E. "Where's the man?"

"Where is he? I need to play now."

While drawing line 2 walks around table to original position; *B* becomes top.

Line 3 "There him is."

Line 4

Q. 4A "Him head."

Q. 4B "That's A, B, C."

E questions concerning line 2, tracing line around page.

Q. 2 "That's the man."

the child, preoccupied with the task of recording parts of the body, may continue his drawing in the new orientation because he fails to see each part in relation to the whole.[66]

c. The subject, finding it easier to complete the desired form by gross movement of the body than by fine movement of wrist and fingers, may produce a circular form by dragging the pencil along the page as he walks around the table.[67]

2. *Change of Theme.*

A chance similarity of the form drawn to another object may suggest a new theme to the child. A shift is made in order to bring the representation of this new object into its conventional top-bottom relationship upon the page. In Situations 1, 2, 3, and 5 Subject 13 has represented the lower limbs as circular or oval forms attached to the basal. In S13-6 this same schema[68] is begun but as the right leg is drawn its circular outline suggests a "wheel." The child walks around the table 90 degrees to the right. The leg of the man is thus transformed into the rear wheel of an "automobile" and the "man who drives it" is reduced to a single circle placed upon the "seat" within the "car."

3. *Dissatisfaction with the Drawing.*

a. Rotation may be used as a means of erasure. In S8-4 the shift occurs following an apparently aimless initial scribble.[69] In this case the attempted erasure is not successful, since the arm of the completed man crosses the scribble, and the undesired line is later rationalized by the comment, "That's to hold that arm."

b. Loss of interest or sense of failure may be expressed by a shift in orientation. In S10-1, following the request to draw a man[70] the subject enquires, "How do you make the legs?" He then draws a single hooked line vaguely resembling a leg and foot, but immediately rotates the sheet 180 degrees and scribbles hurriedly over the entire page.[71]

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[66] See S8-2, Figure 13.

[67] See S7-6, Figure 16.

[68] See Figure 17.

[69] See Figure 17.

[70] See Figure 18.

[71] Hetzer (13, p. 76) describes a drawing by a child of 3.6 in which rotation accompanies a change of theme and is used as an expression of dissatisfaction. The pictured "woman" suggests a "house." "Windows"

4. *An Error in the Mutual Orientation of Parts.*

Rotation may serve as a means of correcting a faulty orientation of parts within the whole (S5-2, described above).[72]

5. *A Deviation from the Conventional Top-bottom Relationship of the Figure upon the Page.*

A violation of the conventional top-bottom relationship of the figure relative to the child may be corrected by means of rotation before the drawing is complete. In S5-3 the legs are drawn as vertical lines[73] projecting upward from the basal and ears are added at the lower end. Prior to construction of the arms a rotation of 180 degrees brings the figure into upright posture.

6. *Exploratory Manipulation of the Paper.*

In a number of drawings the shift in orientation appears to be no more than exploratory manipulation of the paper as a medium of graphic expression. In S4-1 the basal is drawn in the center[74] of the page, which is then rotated 180 degrees prior to the addition of lower limbs. Conditions are such that neither the amount of available space, nor the point of closure of the basal, nor the tendency to draw the legs perpendicular to the edge of the paper nearest to the head,[75] can explain the shift. The basal is rotated much as a lump of clay is turned and patted in the hand preparatory to further differentiation.

Table 13 shows the number of shifts occurring in each of the nine drawing situations grouped under whichever one of the six factors described above appears to be dominant. Exploratory manipulation of the paper shows the highest frequency. It is probable that this factor plays a part in all intentional variations in the position of the paper relative to the child. While the total number of drawings in which shifts occur is too small to permit conclusions concerning the effect of the different drawing situations, the distribution is perhaps not without significance. The absence of shifts in Situations 8 and 9 may result from an inhibition of

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are added which prove displeasing to the child, and after rotation the drawing is completed as a woman.

[72] See Figure 10.

[73] See Figure 11.

[74] See Figure 18.

[75] Rouma (23, pp. 106-110) cites cases in which these factors determine orientation of the completed figure upon the page.

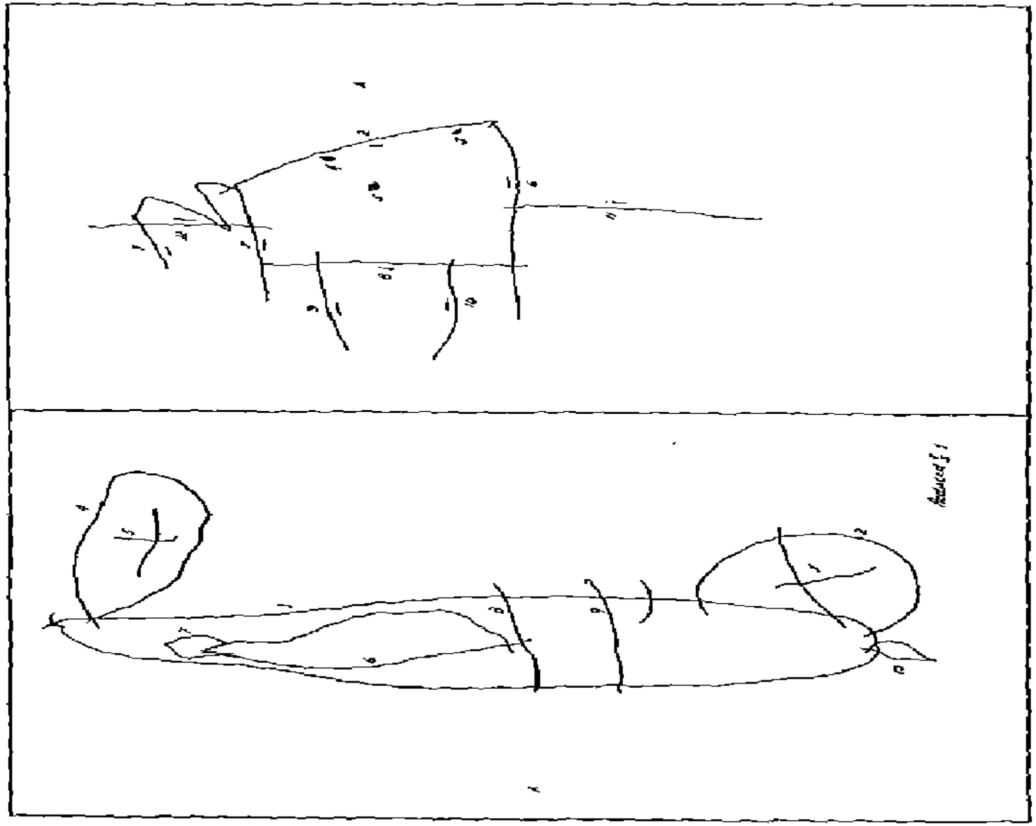

FIGURE 17

(*Left*)

Subject 13

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

Lines 1-2 While drawing line 2 walks around table 90 degrees to the right; *A* becomes top as line 2 is completed.

Line 3 "I'm making a car."

Lines 4-9

Q. 2-3 "Wheel."

Q. 6 "Seat."

Q. 7 "Man drives it."

Q. 8-9 "Window."

E. "What's the whole thing?"
"It's a car."

Line *10*

Q. 10 "Tail."

E asked again, "What's the whole thing?"
"*An automobile.*"

(*Right*)

Subject 8

Situation 4: *Man.* 2nd Day.

Record of Drawing:

As *E* presents paper and pencil, "Mama says don't do no more belly buttons on any more men. . . . I'll draw a bunny." *Does so. E requests naming of parts.* As she hands drawing to *E*, she mumbles what *E* understands as "Arms." *E*: "Where are his arms?" "Yeh, but he has no arms." *Fresh sheet presented with request to draw a man.*

Line 1 Rotates 90 degrees counterclockwise; *A* becomes top.

Lines 2-11 (at line 3 shifts pencil to left hand)

Tries to erase line 1.

Line *12*

Q. 1 "That's to hold that arm."

Q. 5 "That's his nose."

Q. 3-4 "His eyes."

Q. 11 "Arm."

Q. 9-10 "Legs."

Q. 8 "That's *the line that can go up to the feet.*"

Q. Lower part of 6 and 7. "That's the line," after a puzzled pause.

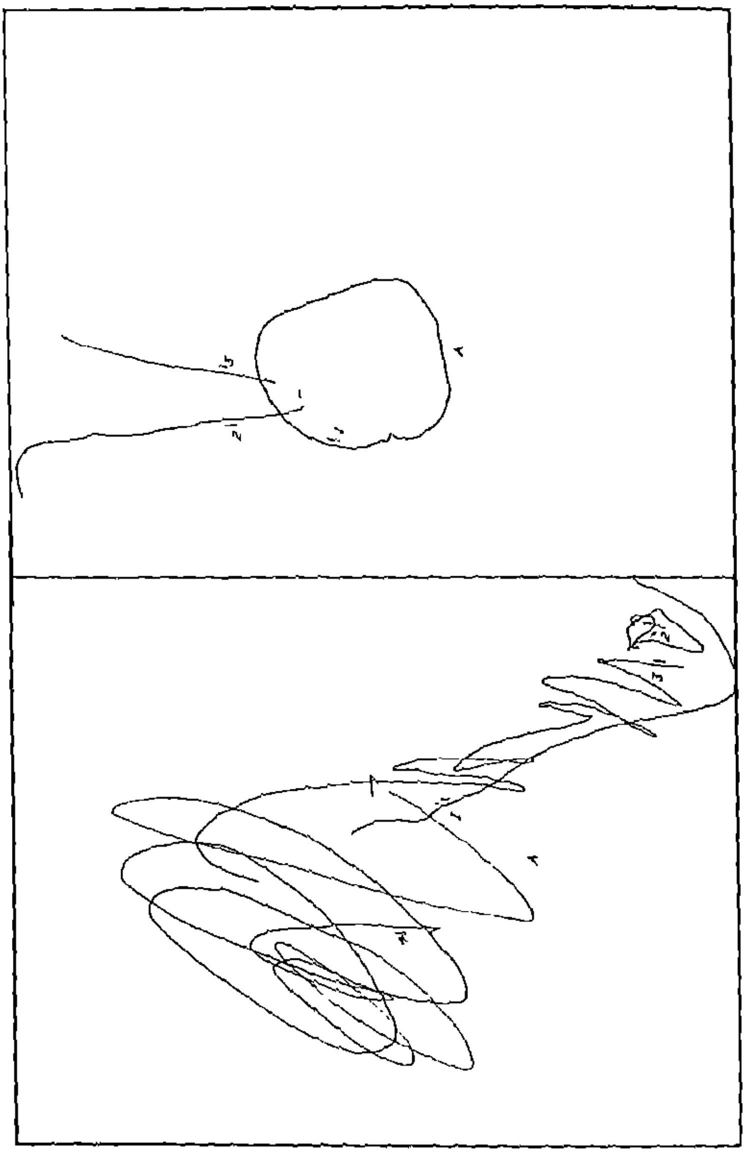

FIGURE 18

(Left)

SUBJECT 10

Situation 1: *Man*. 1st Day.

Record of Drawing:

"How do you make the legs?"

Line 1

Looses interest. Rotates 180 degrees; *A* becomes top.

Line 2 "There's a horsey."

Lines 3-4

At completion *E* asks where the man is.

Points to upper end of line 1, "The man's over here: this the man."

(Right)

SUBJECT 4

Situation 1: *Man*. 1st Day.

Record of Drawing:

Line 1 "Here's a head for him?"

Rotates 180 degrees; *A* becomes top.

"Do you think I can make any feet?" Lines 2-3

"Look, it's a nice man."

Q. 1 "Head."

Q. 2-3 "Feet."

Q. hook at end of 2 "Toes."

the exploratory tendency. In Situation 8 the moment a part is drawn the examiner names the next one. In order to hold the subject's interest throughout this lengthy task no pause is permitted. The repeated verbal requests tend to focus the child's attention upon new aspects of the problem and inhibit reconsideration of those relationships already represented. In Situation 9 attention is directed toward specific aspects of the drawing problem prior to the first stroke. This direction of attention toward a part may tend to inhibit consideration of the whole and so limit experimentation in the means of representing this whole. Conversely, the absence of specific instructions in Situations 1 and 4 may result in a fuller expression of this exploratory tendency.

Stern (26), Eng (5), and others use the term "spacial displacement" to designate in the completed drawing any violation of the adult convention of placing the head at the far side or "top" of the page and the feet at the near side or "bottom" of the page. Several of the biographical studies (16, 23, 5) report a period in which the child appears to be entirely indifferent to spacial position. The human figure is drawn upside down or horizontally quite as readily as in upright posture. A single faulty orientation may be adhered to for a period of time (16, pp. 72-73) or several orientations may appear in a single sitting on the same sheet of paper (17, p. 702). Rouma (23, pp. 105-112) has analyzed the factors which determine spacial position among children who show this "indifferent orientation." He lists three factors mentioned above: the amount of free space left upon the page, the point of closure of the head circle, the tendency to draw the legs perpendicular to the edge of the paper nearest to the head. He cites the case of a four-year-old child who after completion of the drawing recognizes the displacement, saying, "My man isn't straight. Wait, I'll make him straight," as he rotates the sheet to bring the paper into conventional position (23, p. 108).

That the adult convention may not appear logical to the child is shown in comments such as that given in S4-4 of the present study. After completing the drawing with the head at the left and the legs extending horizontally to the right the subject remarks, "He's lying down in bed, but I can stand him up." This he does, not by rotating the paper to bring the figure into conventional top-bottom relationship, but by placing the paper on edge so that the figure stands with "feet" only in contact with the table. Far from being indifferent to spacial position he has begun to recognize the difficulty of expressing in a two-dimensional medium his perceptions of a three-dimensional world.

In Table 14 are listed all drawings in the series in which the orientation of the completed figure relative to the child deviates from the adult convention of placing the head at the far side and the feet at the near side of the page. Only those drawings are included in which both the differentiation of parts and their mutual orientation are adequate to reveal a top-bottom relationship within the figure. If eyes are drawn at the center of the basal it is im-

TABLE 14

Frequency of Drawings in Which the Orientation of the Completed Figure Relative to the Child Shows a Deviation from the Convention of Placing Head at Far Side and Feet at Near Side of the Page

Position of the completed figure	Situations 1	2	3	4	5	6	7	8	9	No. of drawings	% of drawings
Reversed vertical ..				1		1		1		3	
Horizontal	2	1		3				2		8	
Oblique downward ..	1	2		1	2			3	1	10	
Number of drawings which deviate from conventional position	3	3	0	5	2	1	0	6	1	21	
Number of drawings in which a top-bottom relationship is indicated	11	9	9	11	8	11	7	14	12	92	
Percentage of drawings indicating a top-bottom relationship which deviate from conventional position	27	33	0	45	25	9	0	43	8		23

Average percentage of drawings, Sits. 1 and 4, the "Man" 36
Average percentage of drawings, Sits. 2 and 5, "Little Man" .. 29
Average percentage of drawings, Sits. 3 and 6, "Big Man" ... 5
Average percentage of drawings, Sits. 2 and 3, small paper ... 17
Average percentage of drawings, Sits. 5 and 6, large paper ... 17
Average percentage of drawings, Sits. 1, 2, 3, 1st day 20
Average percentage of drawings, Sits. 4, 5, 6, 2nd day 26

possible to distinguish top from bottom unless other parts are represented, but basal and eyes alone are sufficient if the eyes are placed at one end of the basal. An error in the mutual orientation of parts may obliterate a top-bottom relationship if few parts are differentiated, but will not do so if differentiation is adequate to permit distinction between the head-end and the foot-end in spite of this error.

In 23 per cent of all drawings in which a top-bottom relationship can be recognized the orientation of the completed figure relative to the child is at variance with the conventional position. This number is slightly larger than that found in the case of shifts in orientation during construction of the drawing, but is too small to permit an evaluation of the differences between situations. Sixty-three per cent of the subjects show a deviation from the conventional position in at least one drawing of the series.

Of the 21 drawings in which a final deviation is recorded only three show a shift in the course of the drawing process. So-called "indifferent orientation" may at this age level be one expression of the tendency to experiment in an unfamiliar task, an alternate expression of the same tendency which causes a shift of orientation in the course of the drawing process. In whatever position the figure is placed on a flat sheet of paper the man may appear to be "lying down in bed" to the child who has not yet learned to interpret and reproduce our graphic technique. Various spacial positions are tried out in the child's repeated attempts to express his knowledge of spacial relationships through the unfamiliar graphic medium.

E. THE MENTAL AGE EQUIVALENT OF THE DRAWINGS AS SCORED BY THE GOODENOUGH SCALE

The mental age equivalent of the drawings, when scored by the Goodenough (10) scale, offers a compound measure of those factors of differentiation, synthesis, and the relative proportion of parts which have been found to correlate with mental age.

Tracings of all drawings in the series were presented in a uniform random order to two judges, working independently. Both judges were first grade teachers, well acquainted with the characteristics of children's drawings and trained in the scoring of tests. They were unfamiliar with the conditions of the experiment and were told only that the drawings were those of young children made in response to the request to draw a man. Direction and sequence of line and the position of the paper at the beginning of the drawing process were indicated on the tracings, but the child's comments and postural behavior were not given. The judges were instructed to "hold the paper at whatever angle is most favorable, at whatever angle makes the drawing look most like a man to adult eyes." All tracings were made on paper 11 by 8½ inches. In the case of the "Big Man" and the "Little Man" drawn on large sheets the tracings were reduced in size so as to maintain the same relative proportion between drawings and paper as that found in the originals. In the case of all other situations the tracings were exact reproductions of the originals in size as well as in form.

The extent of disagreement between the two judges as to the parts of the body represented has been reported above. Not all disagreements affect the *MA* equivalent of a drawing. The judges may disagree as to what part of the body a given line represents, but both record the drawing of some one of the parts the presence of which scores a point in the scale. The average variation between the judges in the number of scale points assigned to a drawing is .8. Since the addition of a single point adds 3 months to the *MA* value of a drawing this difference is equivalent to 2.4 months of mental age. The disagreements do not affect the average *MA* of the group computed on the basis of all drawings in the series. The scoring of Judge I yields an average *MA* of 44.4 months, that of Judge II an average of 44.3 months.

Table 15 gives the average mental age of the group under the conditions imposed in each of the nine drawing situations. The first situation, the man drawn at the beginning of the first sitting, is comparable to the Goodenough norms based upon a single drawing from each child. Since it precedes the man completion series and initiates the drawing series it is free from any practice effect or influence of the special conditions. The average mental age of the experimental group by this criterion is 45.8 months, 2.2 months below the chronological age.

Within the first six situations there is a slight drop in the curve as the series advances. Size cannot be the determining factor since the difference between the "Man" at each of two sittings is greater than the difference between the "Man" and the "Big Man" or the "Little Man" at any single sitting.

The drop might be attributed to a general decrease in interest

TABLE 15
The Mental Age Equivalent in Months for Each Drawing in the Series

	Situations												
Subjects	1	2	3	4	5	6	7	8	9	Maximum sits. 1-6	Minimum sits. 1-6	Difference sits. 1-4	Diff. max. & min. sits. 1-6
1	43.5	37.5	39.0	39.0	42.0	48.0	36.0	45.0	39.0	48.0	37.5	4.5	10.5
2	46.5	46.5	40.5	39.0	45.0	43.5	37.5	55.5	39.0	46.5	39.0	7.5	7.5
3	40.5	40.5	39.0	39.0	40.5	45.0	37.5	43.5	39.0	45.0	39.0	1.5	6.0
4	43.5	42.0	45.0	42.0	42.0	42.0	45.0	64.5	42.0	45.0	42.0	1.5	3.0
5	58.5	54.0	54.0	48.0	51.0	39.0	37.5	54.0	37.5	58.5	39.0	10.5	19.5
6	40.5	39.0	39.0	36.0	36.0	37.5	37.5	39.0	36.0	40.5	36.0	4.5	4.5
7	39.0	52.5	48.0	51.0	42.0	42.0	37.5	43.5	40.5	52.5	39.0	12.0	13.5
8	52.5	51.0	54.0	52.5	51.0	52.5	63.0	64.5	45.0	54.0	51.0	0.0	3.0
9	39.0	39.0	39.0	40.5	37.5	37.5	36.0	51.0	37.5	40.5	37.5	1.5	3.0
10	36.0	36.0	39.0	36.0	36.0	37.5	36.0	36.0	36.0	39.0	36.0	0.0	3.0
11	42.0	42.0	42.0	37.5	37.5	48.0	39.0	43.5	46.5	48.0	37.5	4.5	10.5
12	51.0	36.0	37.5	36.0	39.0	37.5	37.5	36.0	40.5	51.0	36.0	15.0	15.0
13	55.5	52.5	54.0	36.0	51.0	39.0	46.5	39.0	55.5	55.5	36.0	19.5	19.5
14	48.0	39.0	46.5	47.0	*	49.5	57.0	70.5	54.0	57.0	39.0	9.0	18.0
15	48.0	46.5	48.0	45.0	*	*	46.5	61.5	45.0	48.0	45.0	3.0	3.0
16	48.0	48.0	49.5	52.5	*	52.5	51.0	57.0	58.5	52.5	48.0	4.5	4.5
Average	45.5	43.9	44.6	42.9	42.3	43.4	42.6	50.3	43.2	48.8	39.8	6.2	9.0

Average mental age equivalent, Situations 1 and 4, the "Man"	44.4
Average mental age equivalent, Situations 2 and 5, the "Little Man"	43.1
Average mental age equivalent, Situations 3 and 6, the "Big Man"	44.0
Average mental age equivalent, Situations 2 and 3, on small paper	44.3
Average mental age equivalent, Situations 5 and 6, on large paper	42.9
Average mental age equivalent, Situations 1, 2, 3, *the first* day	44.8
Average mental age equivalent, Situations 4, 5, 6, the second day	42.9

Note: The mental age equivalent of a drawing is the average of the scores assigned it by two judges, using the Goodenough Scale for the Measurement *of Intelligence by drawing.*

*Situation omitted

in the drawing task, resulting in a shorter attention span and more careless execution of the drawing. The preceding analysis made with the help of the child's comments has shown, however, that the number of parts drawn remains constant throughout the series. Judged by this criterion the drawings of the second day are no less complete than those of the first. The finding that the choice of parts is highly variable and that new parts are substituted for those already used to represent a man, suggests a shift of interest to new aspects of the drawing problem rather than a loss of interest in the assigned task. Experimentation rather than boredom is indicated.

This experimentation may result in a decrease in the general representative value of the drawings. Preoccupation with the task of cataloguing new parts may distract the child from their careful representation, or the new parts may be indicated by a scribble, not because the child lacks interest in the mode of representation but because he has not yet established graphic symbols to designate these parts.

Situations 7 and 9 fall within the range of the first six situations. The opportunity to draw from copy and the direction of attention toward head and legs had no effect upon the average mental age equivalent of the drawings. Situation 8 shows a sharp rise in the curve. The reenforcement of attention by suggesting verbally one by one the several parts of the body yields an *MA* equivalent 4.5 months above that found in any other situation and 6.7 months above the average of the remaining eight situations. This superiority of the "Man on Dictation" is comparable to that shown by the joint measure of differentiation and synthesis reported above.[70]

There is marked variability among the drawings of an individual. When Situations 1 and 4 are compared we find an average difference in *MA* equivalent of 6.2 months and a maximum difference of 19.5 months. Within Situations 1 to 6 the average difference between the maximum and minimum scores is 9 months, and 31 per cent of the group show a difference of over a year.

To what extent this variability is a function of the experimental series, though independent of the specific conditions, and to what extent it is characteristic of spontaneous drawings of four-year-old children is uncertain. It is in marked contrast to Goodenough's findings among 194 first grade children. She reports a correlation of .937±.006 between original scores and scores earned in a retest on the following day (10, p. 48).

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[70] See Table 12.

It is of interest that in spite of a wide variability in the choice of parts within the drawings of an individual, found among our small group of four-year-old children, the relative frequency of occurrence of these parts in a series of drawings is highly similar to that shown by a large group of children six months their seniors. The results from Situations 1 to 6 were compared with Goodenough's figures for the percentage of occurrence of each item in her scale in the drawings secured from her group of 119 normal four-year-old children (10, pp. 24-25). Since in Goodenough's study ages were taken to the last birthday her figures apply to the interval midway between birthdays, in this case to 4½ years. With one exception figures for the present study are consistently lower than those found by Goodenough, as would be expected with children six months younger than her group, but the rank order of the various items in the scale follows closely that shown by the older children.

Measurement of the drawings by the Goodenough scale by judges unfamiliar with the conditions of the experiment yields results closely similar to those of the preceding analysis. There is great variability within the drawings of an individual. With the exception of Situation 8, the specific instructions given in the several situations have little or no effect upon group scores. The drawings secured under the conditions imposed for the "Man on Dictation" show an average mental age equivalent clearly in excess of that found in any other situation.

F. ADAPTATION TO THE INSTRUCTIONS CONCERNING SIZE

In five of the nine drawing situations specific verbal instructions are given which pertain to the size of the drawing as a whole or to the size of its parts. Situations 2, 3, 5, and 6 were designed as a measure of the child's ability to increase or decrease the size of the total drawing in response to the key words, "little" and "big," Situation 9 as a measure of his ability to modify the relative proportion of parts in his accustomed formula to accord with the examiner's description of a "funny man" with "a little bit of a head and great big, long legs."

1. *The "Man from Description."*

The preceding analysis has brought to light various unforeseen difficulties in establishing norms for purposes of comparison. In few cases is there sufficient uniformity in the parts represented in the course of the series to permit a comparison of their relative size. Of the 11 subjects who differentiate the lower limbs from the basal form in the "Man from Description" only nine do so in either Situation 1 or Situation 4, and only five in both Situations 1 and 4 (Table 5). The instructions in Situation 9 were based on the assumption that in "tadpole" drawings the circle represents the head and the appendages the legs. A relative decrease in the area of the circle and an increase in the length of the appendages in comparison with preceding drawings would thus show adaptation to the specific instructions. Analysis indicates that this assumption is not justified. The circle often includes more than the head and may include the lower limbs. The head may be drawn as a part distinct from the basal in Situation 9 but in none of the first six situations be given a separate graphic form (Subjects 9, 13, 14) or it may be differentiated in one or more of these situations but not in Situation 9 (Subjects 7, 10, 16). Failure to distinguish the verbal symbols for the parts which compose the lower limbs presents a further difficulty in evaluating the response in Situation 9. The child for whom "legs" and "feet" are synonymous terms when applied to parts of his own body may not interpret the examiner's instructions as does the child who has made this differentiation. In view of these findings a comparison of the relative proportion of parts in the different drawing situations is not justified.

2. *The "Big Man" and the "Little Man."*

In drawings as primitive as those of the present study length and breadth are better measures of size than is area. Few of the parts are represented as two-dimentional forms. Imperfectly closed circles, gaps between parts, configurations of straight, curved, and broken lines, which block out the figure but present no clear cut boundaries, make the computation of area highly uncertain. As a measure of the height of the man we have taken the greatest vertical distance between the head-end and the foot-end in drawings in which the differentiation of parts is adequate to reveal this top-bottom relationship. In those in which there is no differentiation of parts or in

TABLE 16

VARIATIONS IN THE HEIGHT AND BREADTH OF THE ENTIRE FIGURE WITHIN THE FIRST SIX DRAWINGS OF THE SERIES

Sub-jects	Measurements of drawings in centimeters											
	First day						Second day					
	Sit. 1 "Man"		Sit. 2 "Little Man"		Sit. 3 "Big Man"		Sit. 4 "Man"		Sit. 5 "Little Man"		Sit. 6 "Big Man"	
	H't	Br'th	H't	Br'th	H't	Br'th	H't	Br'th	H't	Br'th	H't	Br'th
1	9.4	5.8	9.9	2.3	8.8	5.8	11.9	8.4	2.7	2.8	35.6	15.1
2	12.1	2.4	6.1	2.2	15.6	10.5	9.0	2.5	17.4	4.4	44.5	22.3
3	19.4	17.5	23.0	18.6	25.5	14.5	25.3	16.4	7.2	10.2	50.8	13.4
4	17.0	6.4	8.5	5.7	23.7	5.8	13.6	11.5	14.4	6.6	49.9	13.6
5	26.8	13.2	15.6	17.6	21.4	19.9	27.0	11.5	24.3	10.3	49.8	30.8
6	5.1	3.4	3.8	3.1	27.6	19.6	17.5	12.5	50.4	29.5	50.2	33.1
7	22.1	20.0	24.3	8.6	26.7	18.7	25.4	18.6	2.3	1.7	46.3	37.9
8	13.4	9.3	3.7	1.5	14.5	11.1	12.5	18.4	9.2	2.7	49.5	36.9
9	5.5	2.2	9.2	8.3	9.5	2.4	13.0	7.0	16.2	7.8	49.6	10.2
10	24.0	18.4	1.0	1.2	5.4	0	19.5	10.8	4.8	1.8	48.6	37.9
11	25.0	5.9	12.3	3.6	27.3	6.6	18.4	12.9	7.1	7.3	48.7	17.7
13	15.3	9.3	12.4	18.1	17.8	11.3	17.6	4.5	5.1	3.4	2.1	3.3
14	15.9	11.3	.6	.9	27.9	14.5	16.9	8.7			50.5	17.2
15	15.5	5.9	18.2	2.2	24.6	3.7	18.1	5.9				
16	3.3	1.9	20.9	8.2	13.5	13.3	26.3	19.6			48.5	36.2
Avg.	15.3	8.9	11.3	6.8	19.3	10.5	18.1	11.3	13.4	7.4	44.6	23.3

Percentage of subjects who vary size of drawing in required direction:			
Sit. 2, the "Little Man"	Height 60%	Breadth 67%	
Sit. 5, the "Little Man"	Height 67%	Breadth 75%	
Sit. 3, the "Big Man"	Height 80%	Breadth 60%	
Sit. 6, the "Big Man"	Height 93%	Breadth 86%	
Avg. Sits. 2 and 5, the "Little Man"	Average height and breadth		67.3%
Avg. Sits. 3 and 6, the "Big Man"	Average height and breadth		79.8%
Avg. Sits. 2, 3, 5, and 6	Average height and breadth		73.5%
Average percentage of variation in measurement in required direction:			
Sit. 2, the "Little Man"	Height 26.1%	Breadth 23.6%	
Sit. 5, the "Little Man"	Height 25.9%	Breadth 34.5%	
Sit. 3, the "Big Man"	Height 26.1%	Breadth 18.0%	
Sit. 6, the "Big Man"	Height 146.4%	Breadth 106.2%	
Avg. Sits. 2 and 5, the "Little Man"	Average height and breadth		27.5%
Avg. Sits. 3 and 6, the "Big Man"	Average height and breadth		74.2%
Avg. Sits. 2, 3, 5, and 6	Average height and breadth		50.9%

Note: Situation 1 is taken as the standard for the first day, Situation 4 for the second day. The drawings of Subject 12 are omitted from the computation because in Situations 1 and 4 the man is a single dot, which makes variation possible in one direction only.

which the orientation of parts within the whole is so confused that no top-bottom relationship is discernible the greatest diameter is taken as the height. Breadth is determined by dropping perpendiculars from the outermost boundaries of the man to the diameter representing height and computing the distance between parallel lines passing through these outermost points. These measurements for Situations 1 to 6 are given in Table 16.

The "Big Man" and the "Little Man" at each of the two sittings show an average variation in both height and breadth in the direction required by the examiner's instructions. This variation is never less than 18 per cent of the size of the standard man. The percentages of variation are closely similar in Situations 2, 3, and 5 and much larger in Situation 6.

The increased variation in Situation 6 as compared with Situation 3 suggests that the small sheet[77] limits adaptation when an increase in size is called for. This finding is in accord with the observations made in a number of the biographical studies (15, 23, 2) that size of paper may affect either the relative proportion of parts or the size of the total drawing. If the head or basal form fills most of the page there is little space in which to extend the legs; if several parts of the body have been assembled near one edge of the paper it may be impossible to draw arms of normal length, unless the barrier imposed by the edge of the paper is ignored. Rouma (23, p. 108) cites a case at 39 months in which the tendency to repeat automatically the same drawing movements was strong enough to override the restrictions imposed by the paper. The legs were drawn to the right regardless of whether the lines fell upon the page or upon the bare table top. The barrier is usually recognized, however, often with expressions of annoyance, when the pencil approaches it, but may not be anticipated in time to modify the placement and size of the preceding parts. Anticipation of the barrier may restrict the length of the strokes even when all the available space is not used.

The hypothesis that the small sheet of paper limits adaptation to the examiner's instructions in Situation 3 is supported by the finding that those subjects who make a positive adaptation in this situation drew on the average a smaller man in Situation 1 than did those who fail in Situation 3 to adapt to the examiner's instructions (Table 17). In Situation 2 the relationship is reversed: those subjects who adapt positively in Situation 2 drew a larger man in Situation 1 than did those who in Situation 2 fail to make the required adaptation. On the second day the relationship for the "Little Man" is repeated but in the case of the "Big Man" the difference between those who adapt positively and those who do not is slight and in the reverse direction from that found on the first day.

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[77] It will be remembered that the size of the paper is uniform throughout the series with the exception of Situations 5 and 6. The standard size is 27.9 by 21.5 cms.; that in Situations 5 and 6 is 50.5 by 37.9 cms.

TABLE 17

THE AVERAGE MEASUREMENTS OF THE STANDARD "MAN" AMONG THOSE SUBJECTS WHO ADAPT POSITIVELY AND THOSE WHO ADAPT NEGATIVELY TO THE INSTRUCTIONS CONCERNING SIZE IN THE "LITTLE MAN" AND THE "BIG MAN"

Direction of variation from the size of the standard "Man"			Average measurements in cms. of the standard "Man"		
Situation	"Little Man"	"Big Man"	Situation	Height	Breadth
2	+		1	17.2	8.9
2	—		1	12.5	8.8
3		+	1	14.1	6.5
3		—	1	20.1	12.3
5	+		4	19.7	12.6
5	—		4	13.3	7.3
6		+	4	18.2	11.9
6		—	4	17.6	10.5

Note: A plus sign indicates variation in the required direction, a minus sign no variation, or variation in the direction opposite from that required.

These findings may be interpreted in terms of the relative influence of two factors inherent in these drawing situations which serve to limit adaptation to the examiner's instructions. When the required adaptation is one of decrease in size the limiting factor is one of neuro-muscular control, the difficulty, still marked at four years of age, of executing very small pencil strokes. It is easier to draw a "Little Man" if the standard man has been large because the adaptation involves less strain. When the required adaptation is one of increase in size the limiting factor is the edge of the paper.

It is easier to draw a "Big Man" if the standard man has been small, because there is more space in which to expand the drawing. In Situation 5 the limitation of neuro-muscular control is as great as in Situation 2, but in Situation 6 the limitation of the size of the paper is lessened. That the paper was sufficiently large to remove the inhibiting effect is suggested by the finding that the difference between the size of the standard man among those who make the required adaptation in Situation 6 and its size among those who do not is slight and in favor of those who do adapt. Conditions of the experiment are inadequate to show whether the increased size of the drawing in Situation 6 is due solely to increased adaptation to the examiner's instructions, made possible by the removal of the restriction of the paper, or is partially the result of the stimulus of the large paper, irrespective of the examiner's instructions. In Situation 5 any stimulus toward greater size which may result from the increased area of the paper runs counter to the verbal instruction. The fact that the percentages of variation are approximately the same as in Situation 2 suggests that this counter stimulus is not an important factor.

The finding that the basal is frequently called "the man" suggests a possible fallacy in assuming that failure to modify the size of the total drawing in accord with the examiner's instructions indicates a lack of adaptation to these instructions. If the word "man" is identified with the basal, a change in the size of this part in the required direction may be a positive response even if the size of the total drawing does not conform. Variations in the size of the basal have, therefore, been computed.

There are cases in which the basal varies in the required direction whereas the total figure does not, but the reverse relationship is also true (Tables 16 and 18). Group scores show no consistent advantage for either the basal or the entire figure in the number of subjects who adapt positively or in the degree of adaptation. Averages for the "Little Man" are slightly in favor of the basal, for the "Big Man" in favor of the entire figure. When results from all four situations are averaged the percentages for the basal are almost identical with those for the whole drawing. The tendency to identify the term "man" with the basal does not result in a modification in the size of this part at the expense of the whole.

The child may express his concept of size by gross body movement

TABLE 18

VARIATIONS IN THE HEIGHT AND BREADTH OF THE BASAL FORM WITHIN THE FIRST SIX DRAWINGS OF THE SERIES

Subjects	Measurements of Drawings in centimeters											
	First day						Second day					
	Sit. 1 "Man"		Sit. 2 "Little Man"		Sit. 3 "Big Man"		Sit. 4 "Man"		Sit. 5 "Little Man"		Sit. 6 "Big Man"	
	H't	Br'th	H't	Br'th	H't	Br'th	H't	Br'th	H't	Br'th	H't	Br'th
1	7.2	2.3	2.5	1.5	4.8	5.8	5.9	8.4	1.7	1.9	7.7	9.7
2	0.7	1.0	0.8	1.9	8.1	10.5	0.9	1.6	7.9	4.4	33.5	22.3
3	17.8	17.5	23.0	18.6	25.5	14.5	25.3	16.4	7.2	10.2	50.8	13.4
4	7.1	6.1	3.7	5.7	9.1	5.8	6.5	11.5	4.7	6.6	11.9	8.0
5	22.2	4.7	5.1	3.6	20.4	4.9	0.0	10.1	4.3	2.5	49.8	12.7
6	5.1	3.4	3.8	3.1	27.6	19.6	17.5	12.5	50.4	29.5	50.2	33.1
7	22.1	20.0	17.9	8.6	25.8	18.7	24.5	18.6	2.3	1.6	46.3	37.9
8	7.7	9.3	1.5	1.2	10.8	11.1	10.4	8.4	1.1	0.9	49.5	36.9
9	4.6	2.2	3.8	2.0	9.5	2.4	6.4	7.0	14.7	7.6	47.6	10.2
10	24.0	18.4	1.0	1.2	5.4	0.0	19.5	10.8	4.8	1.8	44.6	0.0
11	24.7	5.9	12.0	3.6	27.3	6.6	18.4	12.9	7.1	7.3	45.4	17.3
13	11.2	9.3	8.7	10.5	12.5	11.3	17.6	4.5	5.3	3.4	2.1	3.3
14	15.0	11.3	0.0	0.6	0.0	6.4	10.4	6.8			0.0	5.0
15	3.3	4.0	0.7	0.6	2.9	2.6	3.5	4.5				
16	1.8	0.8	18.3	3.5	13.5	5.6	26.3	19.6			48.5	36.2
Avg.	11.6	7.7	6.9	4.4	13.5	8.4	12.9	10.2	9.1	6.5	34.9	17.6

Percentage of subjects who vary size of basal form in required direction:

Sit. 2, the "Little Man"	Height 80%	Breadth 73%	
Sit. 5, the "Little Man"	Height 67%	Breadth 75%	
Sit. 3, the "Big Man"	Height 67%	Breadth 60%	
Sit. 6, the "Big Man"	Height 86%	Breadth 64%	
Avg. Sits. 2 and 5, the "Little Man"	Average height and breadth		73.8%
Avg. Sits. 3 and 6, the "Big Man"	Average height and breadth		69.3%
Avg. Sits. 2, 3 5, and 6	Average height and breadth		71.5%

Average percentage of variation in measurement in required direction:

Sit. 2, the "Little Man"	Height 40.5%	Breadth 42.9%	
Sit. 5, the "Little Man"	Height 29.5%	Breadth 36.3%	
Sit. 3, the "Big Man"	Height 16.4%	Breadth 9.1%	
Sit. 6, the "Big Man"	Height 170.5%	Breadth 72.5%	
Avg. Sits. 2 and 5, the "Little Man"	Average height and breadth		37.3%
Avg. Sits. 3 and 6, the "Big Man"	Average height and breadth		67.1%
Avg. Sits. 2, 3, 5, and 6	Average height and breadth		52.2%

Note: Situation 1 is taken as the standard for the first day, Situation 4 for the second day. The drawings of Subject 12 are omitted from the computation because in Situations 1 and 4 the man is a single dot, which makes variation possible in one direction only.

and posture and by verbal response, as well as by a change in the size of the drawing. In S3-3 the subject exclaimed as he drew, "That's a big pencil . . . Wow! . . . See, that's a big man . . . Brrrrrrrr!" Following completion of the drawing he dramatized his own bigness by carrying a chair on his head as he strutted about the room. In Situation 6 he drew the full length of the paper and again expressed the concept of bigness by exaggerated body movements. The record reads: "Large, full arm strokes. Stands to the task, leaning over table. Whole body participates. Attacks sheet from a distance as if using a tool much larger than a pencil." Although the fact is not entered in the records, the examiner recalls similar instances in which the idea of littleness is dramatized by hunching of the shoulders and restriction of all body movements.

Hetzer (13) has shown that the representation of an object or of an idea by mimicry develops prior to graphic representation. We find that these generalized and primitive postural and verbal expressions of the concept of size may serve as a substitute for or may accompany the more specific graphic response to the examiner's instructions. The graphic response may be in fact a part of the general body response, since the pencil strokes at this age are governed quite as much by gross movement of arm, shoulder, and back as by fine movement of wrist and fingers.

The observer's notations on grasp of pencil, recorded occasionally when time permitted, indicate the importance of motor control as a factor in the child's response to the instructions concerning size. The variety of positions in which the pencil is held in the course of a single sitting and the inadequacy of many of these positions are shown in the record of Subject 12:

> She tried a wide variety of grasps:
>
> (1) Pencil almost horizontal. Held against palm with third, fourth, and fifth fingers flexed around it. Index extended stiffly along top of pencil. Thumb in partial opposition to index.
>
> (2) Same, except that index is flexed, first joint bending backwards.
>
> (3) Pencil held in tight fisted grasp. Little finger nearest point. Pencil almost vertical.
>
> (4) Pencil held in adult manner, resting in crotch between index and thumb, with index and medius extended and in opposition to thumb.

(5) Same, except that medius is flexed.

In copying the forms progress was halted because she was unable to modify a rigid grasp sufficiently to permit shift in direction of line.

It is of interest that no shifts in the orientation of the paper to the child are recorded in the case of this subject. As previously described, some children avoid the difficulty of inadequate motor control by shifting the paper instead of the pencil or by walking around the table themselves instead of moving either paper or pencil.

G. DEVELOPMENTAL LEVELS IN THE DIFFERENTIATION OF THE BASAL FORM

Arguments in justification of the assumption that a basal form exists in all drawings of the series, and criteria for determining its presence have been given. The various modes of differentiating this basal form into parts, found within the experimental series, represent at least four developmental stages. That this is true may be shown by comparison of our findings with those of longitudinal studies in which the drawings of individual children have been traced over a period of years.

In Rouma's well known classification (23, pp. 22-57) seven stages of development are distinguished in the drawings of young children prior to that period in which there is complete representation of the human figure as seen full face. In tracing this sequence Rouma does not correlate the various stages with either chronological or mental age. He does give within wide limits the age at which his group of normal subjects attain certain of the developmental stages and in some instances he compares the age at which his retarded subjects reach a given stage with that at which normal children attain it. He notes that the work of children without previous drawing experience may at first resemble that of much younger subjects, but progress takes place rapidly through successive stages in a few sittings. All his subjects were over three years of age when first presented with paper and pencil, and some were much older. He finds an overlapping of developmental stages within the drawings of an individual child as well as within a group of normal children of the same chronological age. There are periods of regression when discarded schema reappear, and periods of transition when characteristics of an earlier stage are found side by side with those of a later one. While the rate of development varies, the sequence is markedly similar for all children.

The seven stages, described by Rouma, through which the child has passed normally by five years of age, may be summarized briefly as follows:

1. *Preliminary Period of Indicative Drawing.*

> In the earliest drawings visual representation is entirely lacking. There is no effort to imitate a model, no recognition that the drawing can resemble concrete objects. The marks indicate rather than represent the object. The first stage is one of practice in adapting the hand to the instrument. Drawing is a motor game, pleasurable because it satisfies the need for movement. In the second stage the child names his scribblings after their completion. A chance line becomes "the momentary support of a mental image" (23, p. 25) and may be renamed to accord with any new suggestion. In the third stage the subject of the drawing is announced in advance. The motions made by an adult in drawing may be imitated, but there is still no recognition of the representative function of the lines. In the fourth stage the child recognizes a true resemblance between some chance sequence of lines in his scribblings and a concrete object and, by accentuating certain lines and adding others, attempts to improve the resemblance. This utilization and development of a chance relationship of line was noted within the first week or at most within the first month of drawing exprience in the case of normal children three and four years of age.

2. *Partial Representation of the Human Figure.*

> True representative drawing occurs when the child attempts from the beginning to make his graphic forms resemble the visual appearance of the object. The first attempts are scarcely more than scribblings, but the general form and the general direction of the figure are vaguely suggested. The "tadpole" stage is representative in general form and often in direction but remains indicative as to detail. It is characterized by a circle to which an indefinite number of lines are attached which represent the legs. Feet, arms, and facial features may or may not be present. The transitional stage between the "tadpole" drawing and complete representation of the

> human figure as seen full face is marked by a clearer delineation of the limbs and facial features and by a partial representation of the trunk. The disappearance of the indicative tendency is usually coincident with the adoption of some means of representing the trunk as a part distinct from both head and legs. This transition from indicative to representative drawing is normally complete prior to five years of age, though the indicative tendency may reappear at a later age when the figure is first drawn in profile.

The above classification of the various stages within the preliminary period of indicative drawing is applicable to spontaneous drawings only, to a situation in which the child is allowed to draw whatever occurs to him at the moment and to change his theme at will. The time at which naming occurs and the effect of verbal differentiation upon completion of the drawing serves as a clue to the development of the child's understanding of the representative function of drawing. In our study the object to be represented is specified in advance, and if during the course of the drawing the child's comments show a change of theme the examiner repeats the instructions in an effort to hold him to the assigned task. These conditions make it impossible to distinguish between the second and third stages. Stage four, though it may be suggested, cannot be clearly differentiated. The tendency to shift the theme in accordance with the visual appearance of some chance sequence of lines is shown in a number of instances, more often in drawings clearly representative in nature than in those of the preliminary period, but the original instructions and the repetition of these instructions by the examiner tend to inhibit the development of this tendency.

The drawings of the present study have been grouped, in so far as these limiting conditions permit, in accordance with Rouma's scheme. On each of the examination days there are drawings which fall within the indicative period, others of the "tadpole" stage. In a few the trunk is partially differentiated from head and legs, but in none of these is the drawing as a whole as well developed as in those cited by Rouma in illustration of the period of transition between "tadpole" drawings and those in which there is a complete representation of the human figure.

The sequence of development traced by Rouma is in large measure a sequence in the degree of differentiation of head, legs, and trunk. In the most primitive attempts at representation of the human figure, in which the general form and the general direction are indicated, the head-end is differentiated from the foot-end either by a slight variation in form or by the orientation of the various scribbled parts within the whole. In the "tadpole" stage there is a variation in form between the round head and the sticks for legs. The transitional period is characterized by a clear distinction between head and legs and a partial differentiation of the trunk.

When we analyze the drawings of the present study in relation to the child's comments during the drawing process and his naming of the parts upon request we find that among drawings of all three developmental stages, indicative, early representative, and "tadpole", there are instances of a verbal differentiation of a graphically undifferentiated form and that this verbal differentiation in most cases designates head, lower limbs, or trunk. In a drawing of the indicative period a later stage may be foreshadowed by naming a segment of a single form "the legs" and another segment[78] "the eyes." In a drawing in which there is a vague assembly of facial features within a single encircling form the "tadpole" stage may be anticipated by designating the lower portion[79] of the encircling form "his feet." The transitional period is foreshadowed in a "tadpole" drawing when the upper portion of the leg lines is called "his clothes" and the lower[80] portion "feet."

The sequence of development in the graphic and verbal differentiation of the head, lower limbs, and trunk, revealed within the experimental series, is described below. The four main divisions follow the sequence outlined by Rouma. The indicative stage is comparable to his preliminary period. The early representative stage and the "tadpole" stage follow his description. What we have termed the early transitional stage is a precursor of his period of transition between "tadpole" drawings and complete representation of the human figure as seen full face.

Within the period of indicative drawing a further division has been made according to the rough classification of motor control used by Goodenough. In her scale drawings which consist of "aimless uncontrolled scribbling" indicate a mental age of not over 36 months, those in which "the lines are somewhat controlled and appear to have been guided by the child to some extent" a mental age of 39 months (10, p. 90). We find a verbal differentiation of parts in both the "uncontrolled" and the "controlled" drawings, in the man which is a jumbled mass of lines and the man which is drawn as a single circle.

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[78] See S3-3, Figure 20.
[79] See S16-4, Figure 4.
[80] See S2-2, Figure 27.

The order of the subdivisions, which we sugggest within the four main groupings, does not imply a developmental sequence in every instance. There is no evidence to indicate, for example, that the differentiation of the head from the basal represents an advance over the differentiation of the facial features, or that the graphic recording of the trunk as a separate form within the basal is a step in advance of the representation of the head as a distinct form. The subdivisions show varying modes of graphic differentiation within the developmental stages, but the data are inadequate to suggest in all cases the sequence within these stages.

I. INDICATIVE STAGE

The drawing bears no resemblance to a man.

A. UNCONTROLLED LINES

The man is a single line or a dot or an uncontrolled scribble.

1. *Neither graphic nor verbal differentiation of parts of the body.*[81]

2. *Verbal differentiation of parts of the body within a graphically undifferentiated whole.*[82]

Either during the drawing process or after its completion the child designates a part of the scribble as "head" or "legs."

B. CONTROLLED LINES

The drawing shows some degree of motor control. The "man" is drawn as a single circle, oval, square, or polygon, or as a grouping of several isolated controlled forms, or as a single line or dot within a configuration of controlled forms which the child may name "house," "automobile," "toys."

1. *Neither graphic nor verbal differentiation of parts of the body.*[83]

2. *Verbal differentiation of parts of the body within a graphically undifferentiated basal form.*[84]

Either a segment of the circumference or a part of the area within the single circle or polygon is named "legs," "eyes," "head," "hair."

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[81] See S10-2, Figure 19.
[82] See S6-4, Figure 19.
[83] See S6-2, Figure 20.
[84] See S3-3, Figure 20.

3. *Both graphic and verbal differentiation of parts of the body but no evidence of an understanding of the representative function of drawing.*[85] Several controlled forms are scattered about the page. To each the child may assign the name of some part of the body, or one may be called "the man" and the others designated by the names of the various parts. The forms may be joined by overlapping or may be completely separate. In neither case is there a top-bottom relationship in the configuration of the various parts. Both form and direction are still in the indicative stage.

II. EARLY REPRESENTATIVE STAGE

Either through the orientation of parts within the whole or the shape of the parts the drawing bears a vague resemblance to the human figure.

A. REPRESENTATION OF GENERAL DIRECTION: THE HEAD-END DIFFERENTIATED FROM THE FOOT-END[86]

Both graphic and verbal differentiation of parts is present. A top-bottom relationship is represented in the orientation of parts within the whole, but the shape of the parts is still in the indicative stage. All parts may be scribbled or the same form may be repeated to indicate each part, as a configuration of several circles or of several straight lines. All parts need not be correctly oriented if the general direction of the figure is evident.

B. PARTIAL REPRESENTATION OF FORM

Two or more parts of the body are shown by a variation in the shape of the parts as well as by spacial orientation. Graphic differentiation of the lower limbs from the basal form is lacking or is but partially indicated.

1. *A single encircling form encloses one or more facial features.*
   (a) *There is neither graphic nor verbal differentiation of the basal into head, trunk, or lower limbs.*[87]
   (b) *The head, trunk, or lower limbs are verbally differentiated by so naming the basal.*

The encircling basal form may be called "head," or "face,"[88] or part of it may be termed[89] "body" or "belly"[90] or the perpendicular sides may be named "feet,"[91] or the upper unnamed portion of an oval may contain the eyes while the central part is termed "body" and the bottom is called "legs."[92]

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[85] See S9-2, Figure 14.
[86] See S10-6, Figure 21.
[87] See S3-2, Figure 21.
[88] See S14-1, Figure 3.
[89] See S3-5, Figure 22.
[90] See S3-4, Figure 22.
[91] See S16-4, Figure 4.
[92] See S3-6, Figure 23.

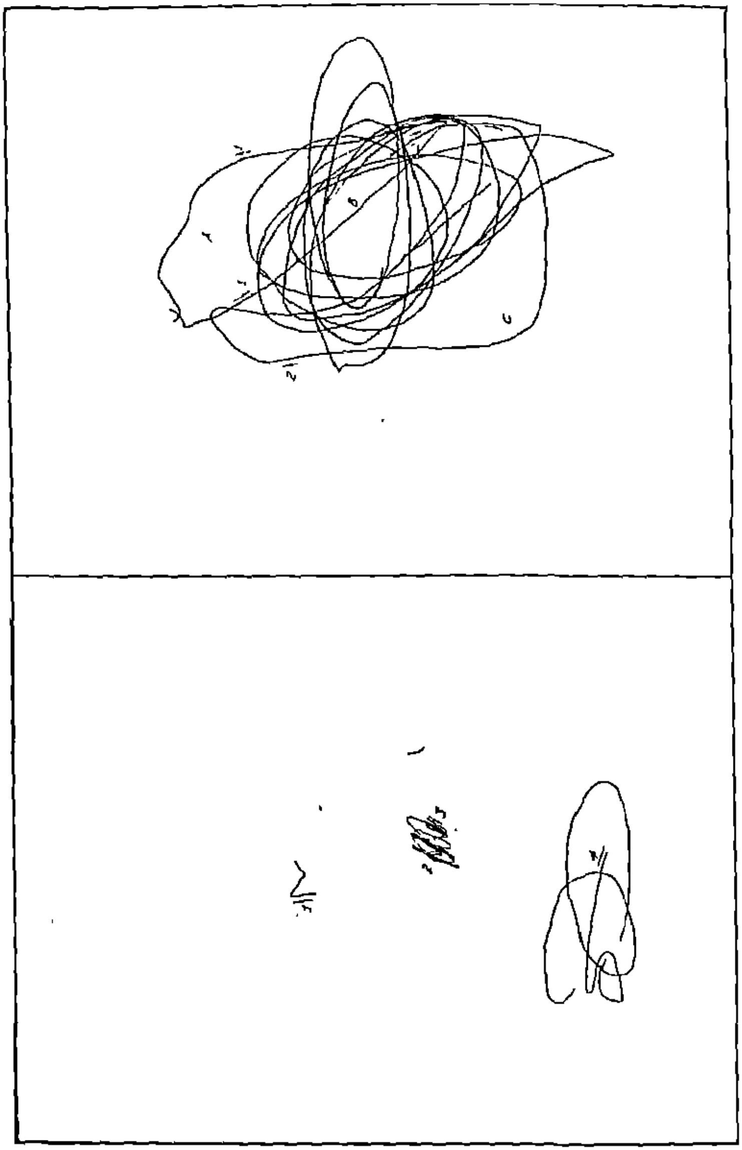


FIGURE 19

(*Left*)

SUBJECT 10

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

Line 1 "There's a man."
Lines 2-3 "That's a number."
Shifts pencil to left hand.
Line 4
E: "Where's the man?"
Points to line 1. "Here."

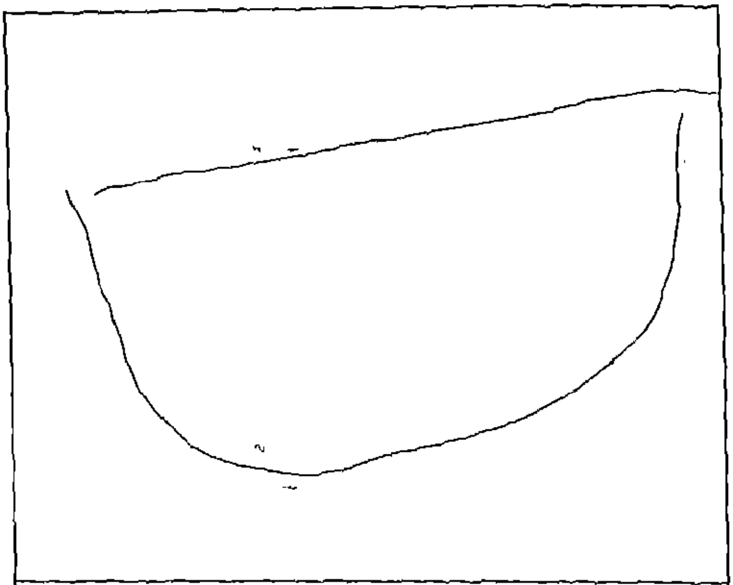
(*Right*)

SUBJECT 6

Situation 4: *Man.* 2nd Day.

Record of Drawing:

"Going to draw his head."
Line 1 (counterclockwise)
Line 2 (starts clockwise, then reverses and ends in counterclockwise scribble)
At completion points to space *A*, "There's his head;" to space *B*, "See his hat;" to space *C*, "There's the boat . . . man isn't there, just the hat."
E: "Sitting in a boat?"
"No," emphatically, "Sitting in the hat."



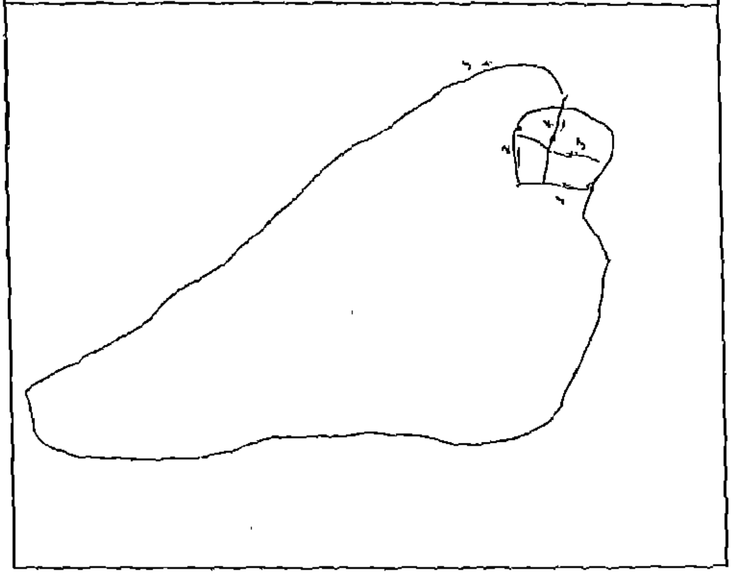


FIGURE 20

(*Left*)

SUBJECT 6

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

Lines 1-4
Line 5 "That's a boat."
Q. 3-4 "Little man riding in a boat."
Q. 5 "Great, big man."

SUBJECT 3

(*Right*)

Situation 3: *Big Man.* 1st Day.

Record of Drawing:

"That's a big pencil. Wow!", emphasizing bigness.
Line 1 "See, that's a big man."
Line 2 "Brrrrr!"
Q. 1 "That's his legs."
Q. 2 "That's his eyes."

Struts about room; picks up chair; carries it on head, "I can pick up a chair right over my head."

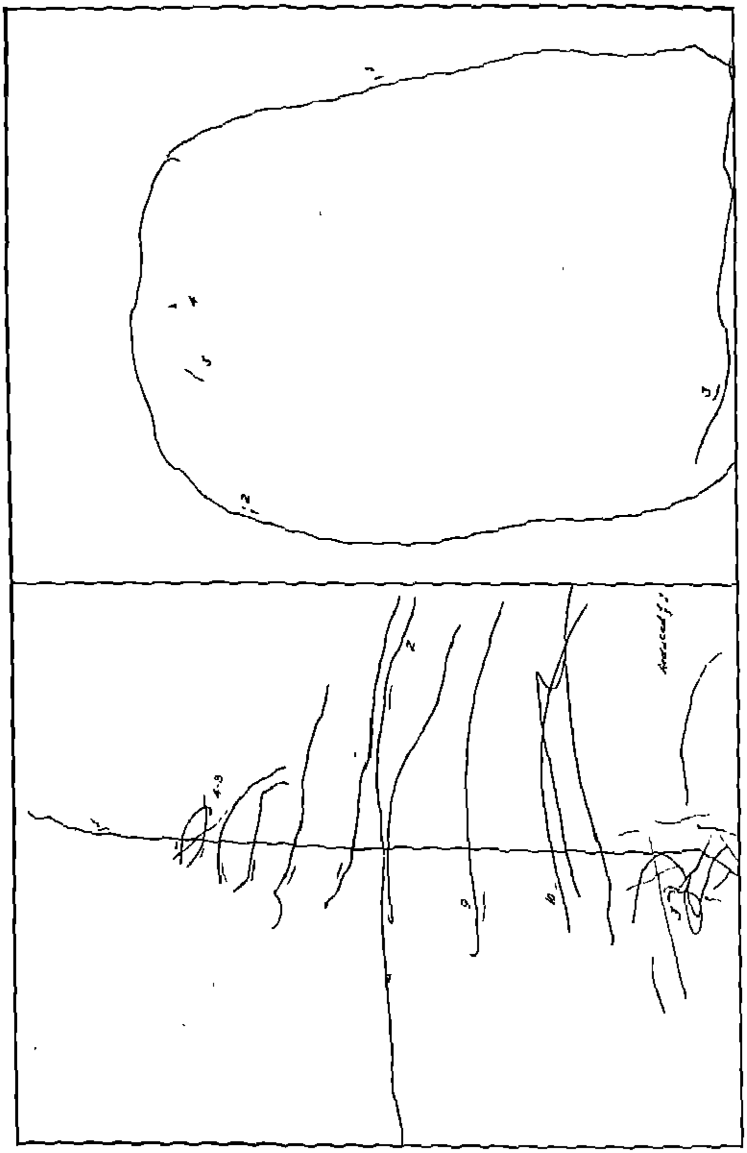

2
9
10

FIGURE 21

(*Left*)

SUBJECT 10

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

Line 1
"Want me to make the hands on him?"
Line 2 (left hand) "Has two hands . . . That's a big man. Make the feet on him."
Line 3 (circular scribble, vertical and horizontal lines) "Want me to make the head?"
Lines 4-8 (right hand).
Lines 9-10 "There's the nose and eyes."
Draws remaining horizontal lines rapidly.

(*Right*)

SUBJECT 3

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

"Me can make a boy."
Line 1 "That it?"
Line 2 "See. Comin' over."
Line 3
Line 4-5 "There his eyes."

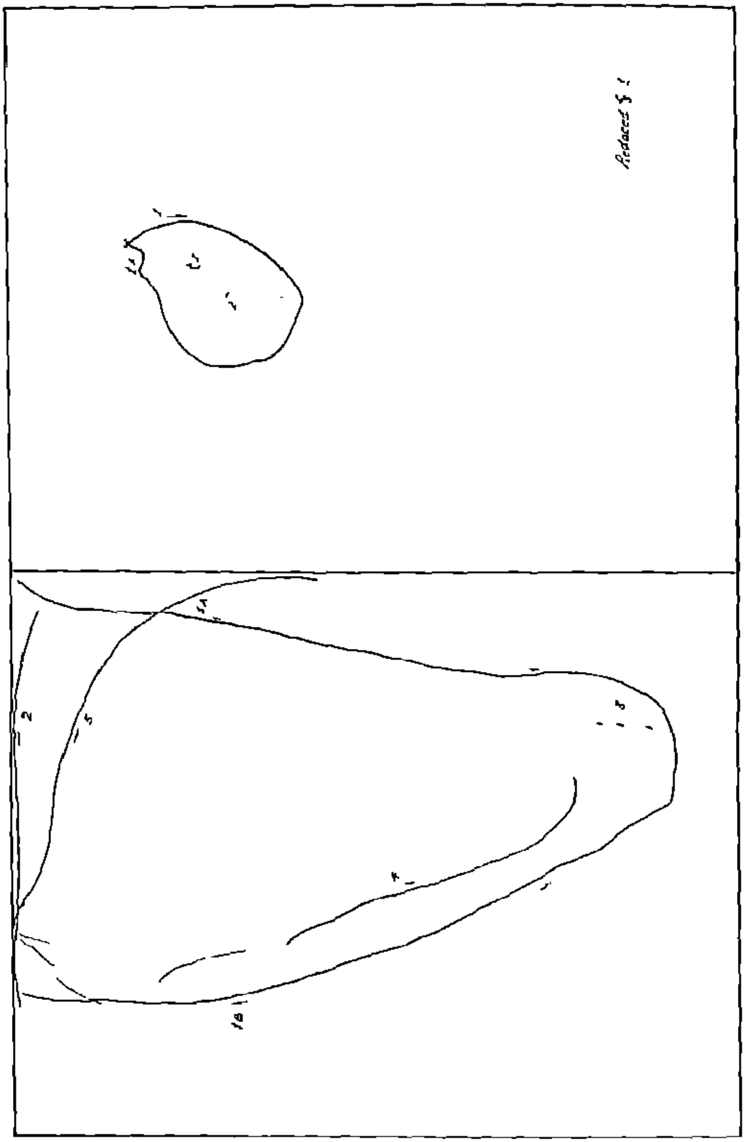

Reduced ½
2
5
1B

FIGURE 22

(*Left*)

SUBJECT 3

Situation 4: *Man.* 2nd Day.

Record of Drawing:

Line 1 "Me don't know how to draw one."
Line 2
Line 3
Q. 1*A* "There are feet."
Q. 1*B* "Him belly."
Q. 2 "A line."
Q. 3 "Them are eyes."
Lines 4-5 Apparently aimless scribbling during responses to questions on preceding lines.

(*Right*)

SUBJECT 3

Situation 5: *Little Man.* 2nd Day.

Record of Drawing:

Lines 1-3.
Q. 1 "That him body."
Q. 1*A* "That him nose."
Q. 2-3 "Them him eyes."

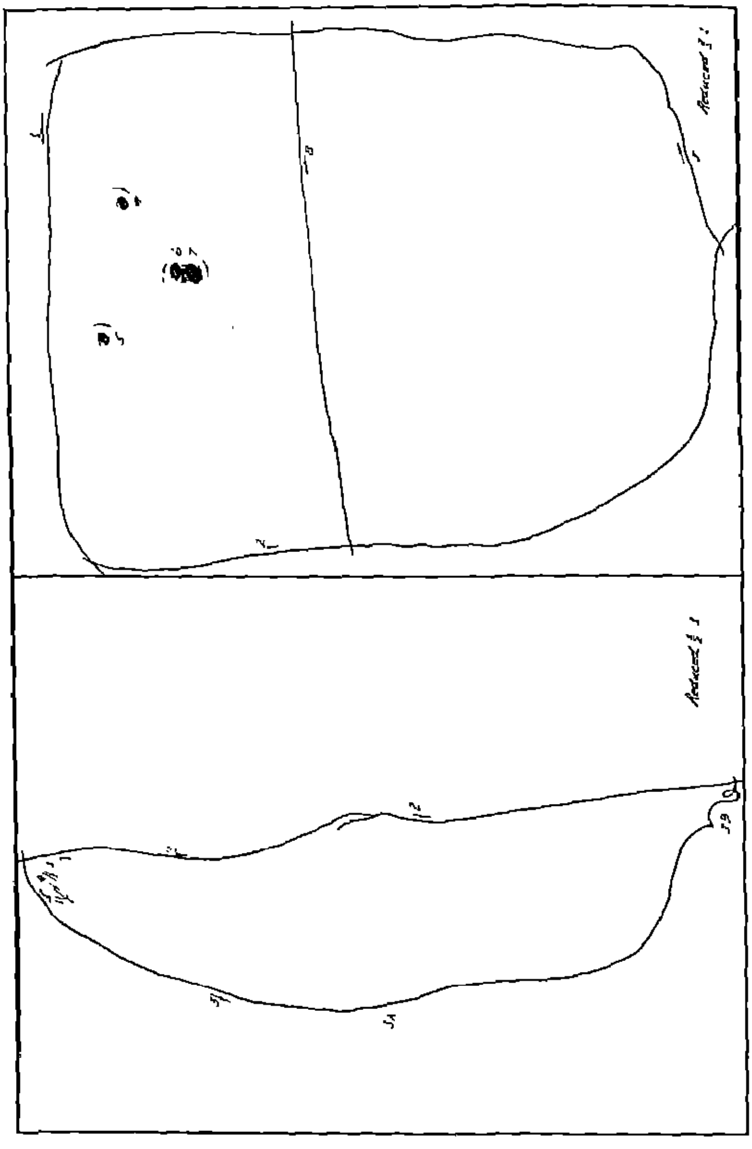

Reduced ½:1
Reduced ½:1

FIGURE 23

(*Left*)

SUBJECT 3

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

"Whoo! What a big sheet!"

Lines 1-5 Large full arm strokes. Stands to the task, leaning over table. Whole body participates. Attacks sheet from a distance as if using a tool much larger than a pencil. Walks to steps and climbs on top of radiator. "Whoo! It's hot!" Returns to table on request.

Q. 4-5 "Him eyes."
Q. *3B* "Him legs."
Q. 2 "Him body."
Q. 3*A* "That body, too."

(*Right*)

SUBJECT 8

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

"All right."

Lines 1-3 (left hand) "This is a big man."
Lines 4-5 "Can you bring dogs in here?"
Line 6 "'Cause I want the doctor to see my dog."
Line 7 "Aw! I forgot to put on the nose."
Connects 7 with 6. "There's a big nose . . . his belly button up to his nose."
Line 8 "That's his mouth."
E: "Is he all done?"
"Yep, a big one."

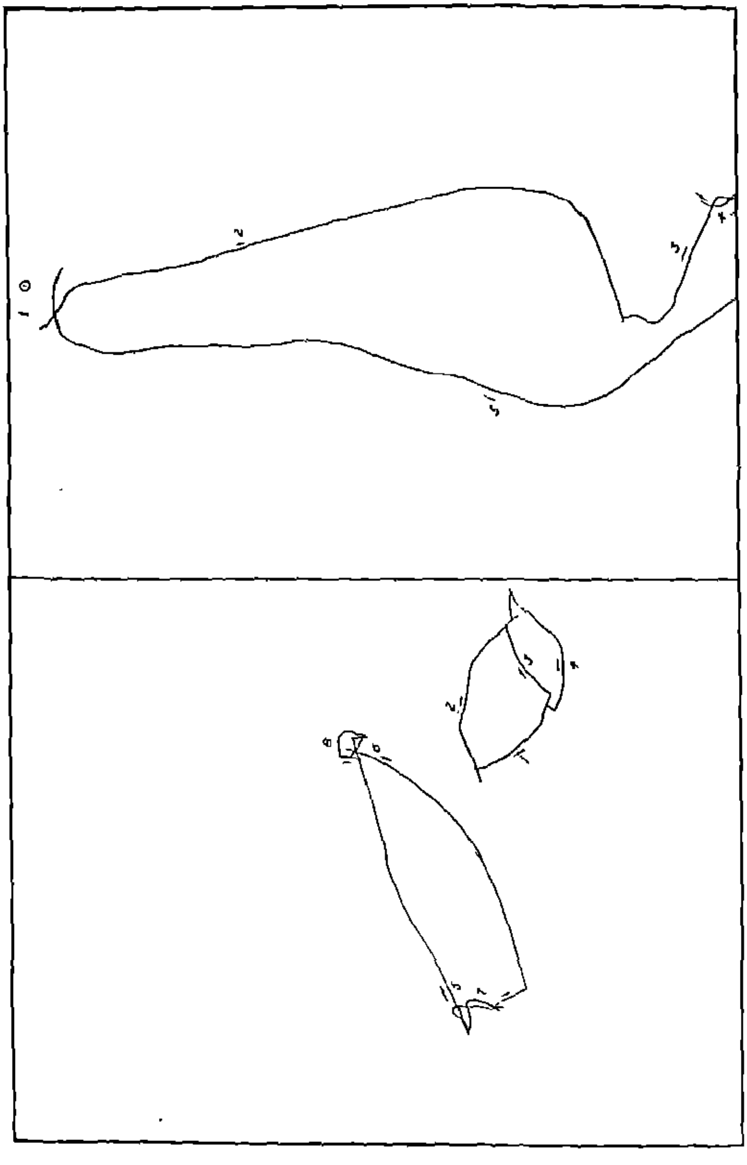


FIGURE 24

(*Left*)

SUBJECT 11

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

Lines 1-4 "Boat."
Lines 5-8 "That's the man."
Q. 8 "Man."
E: "What part of the man is this?"
"Neck."
Q. 7 "Tail." Then quickly, "His hands."
Q. 1-4 "Airplane . . . that's a boat."

(*Right*)

SUBJECT 9

Situation 9: *Man from Description.* 2nd Day.

Record of Drawing:

Line 1 (dot at top of page) "There's his head."
Line 2 "A man just like him."
Lines 3-5
Q. 3-4 "There's his big, long legs."

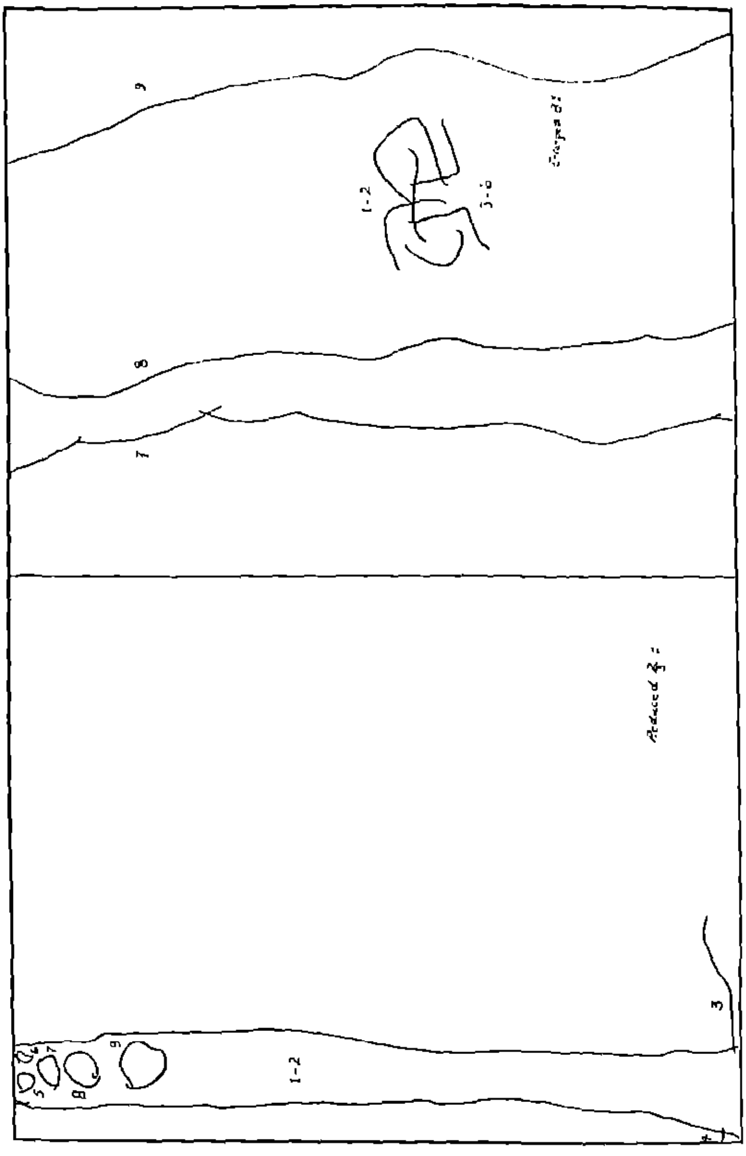

9
1-2
3-6
8
7
Reduced
3
1-2
5
6
7
8
9
4

FIGURE 25

(*Left*)

SUBJECT 14

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

Lines 1-2 "Legs."
Lines 3-4 "Foot . . . foot." After drawing line 4 hesitated as if disconcerted but said nothing.
Lines 5-6 "Eye."
Line 7 "Mouth."
Line 8 "Body."
Line 9 "Belly."
"A great, big man."

(*Right*)

SUBJECT 14

Situation 2: *Little Man.* 1st Day.

Record of Drawing:

Chuckled at request to draw a little man. Took evident pleasure in the smallness of his drawing.

Lines 1-2.
Lines 3-6 (2 legs and 2 feet)
Q. 1-2 "His eyes, I s'pose."
E: Make it big enough so we can see it."

Because of minute size of the drawing *E* did not see lines 3-6 in time to request naming.

Lines 7-9 "Big ones. Lots of big ones." Looked at drawing and laughed. "Tree. Trees with a sign on."
E: "Where's the sign?" Pointed to 1-6.

(*c*) *There is partial graphic differentiation of the trunk, indicated by a dot termed "belly button" drawn within the encircling basal.*[93]

2. *The head is differentiated graphically from the basal form.*

It may be a scribble[94] or a controlled form above the basal[95] or it may be placed inside the basal.[96] The latter may be called "the man" or it may be divided into parts by verbal differentiation of segments of its circumference.

(*a*) *There is neither graphic nor verbal differentiation of the lower limbs.*[97]

(*b*) *The lower limbs are verbally differentiated by naming a part of the basal.*[98]

3. *The lower limbs are partially differentiated from the basal; the head is indicated.*

The lower limbs are formed by elongating the vertical lines composing the sides of the basal, which is not closed at the bottom. The head is indicated by placement of the facial features in the upper end of the figure but there is no dividing line between head and basal or between basal and lower limbs.

(*a*) *There is neither graphic nor verbal differentiation of the trunk.*[99]

(*b*) *There is partial graphic differentiation of the trunk, indicated by a separate circle below the facial features.*[100]

III. TADPOLE STAGE

Two or more parts of the body are shown by a variation in the shape of the parts as well as by spacial orientation. The lower limbs are clearly differentiated from the basal form.

A. THERE IS NEITHER GRAPHIC NOR VERBAL DIFFERENTIATION OF HEAD OR TRUNK

The basal is called "the man"[101] or "the line that can go up to the feet"[102] or "the big round thing what he has with."[103] There may be an overlapping of developmental stages in a single drawing evidenced by calling part of the basal "the feet" even when "feet" are also drawn as distinct parts clearly differentiated from the basal.[104]

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[93] See S8-6, Figure 23.

[94] See S12-9, Figure 9.

[95] See S11-2, Figure 24.

[96] See S7-1, Figure 2.

[97] See S11-2, Figure 24, and S7-1, Figure 2.

[98] See S9-9, Figure 24, and S12-9, Figure 9.

[99] See S14-2, Figure 25, and S5-4, Figure 11.

[100] See 14-6, Figure 25.

[101] See S8-1, Figure 7.

[102] See S8-4, Figure 17.

[103] See S15-3, Figure 26.

[104] See S3-1, Figure 26.

B. THERE IS VERBAL DIFFERENTIATION OF HEAD OR TRUNK BY SO NAMING THE BASAL[105]

C. THERE IS VERBAL DIFFERENTIATION OF THE TRUNK BY SO NAMING A PART OF THE LOWER LIMBS[106]

The upper portion of the leg lines is termed "his clothes" and the lower portion "legs" or "feet."

IV. EARLY TRANSITIONAL STAGE

Three or more parts of the body are shown by a variation in the shape of the parts as well as by spacial orientation. The lower limbs are clearly differentiated from the basal and there is partial differentiation of head and trunk.

A. A PARTIAL DIFFERENTIATION IS MADE BETWEEN HEAD AND TRUNK BY DRAWING THE HEAD AS A SEPARATE FORM WITHIN THE BASAL OR EXTENDING IN PART BEYOND ITS BORDERS

The head may be drawn as a discrete circle[107] or as the central portion of a continuous spiral.[108] In the latter case placement of eyes at the center gives the effect of facial features within the head and head within an encircling body. A central empty space may serve the role of basal or trunk, unbounded except by the limiting lines of the head and limbs which are grouped about it in correct orientation one to another.[109]

B. A PARTIAL DIFFERENTIATION IS MADE BETWEEN HEAD AND TRUNK BY DRAWING THE TRUNK AS A SEPARATE FORM WITHIN THE BASAL

A circle called "body"[110] or "stomach"[111] may be placed within the basal below the facial features. There may be a double partial indication of the trunk in the same drawing: it may be suggested by a row of buttons within the basal and by a separate unnamed circle placed in series between the head and one side of the basal.[112]

C. HEAD AND TRUNK ARE PARTIALLY DIFFERENTIATED BY PLACING THE FACIAL FEATURES IN THE UPPER PORTION OF AN ELONGATED BASAL FORM[113]

The distribution of these four developmental stages and of the

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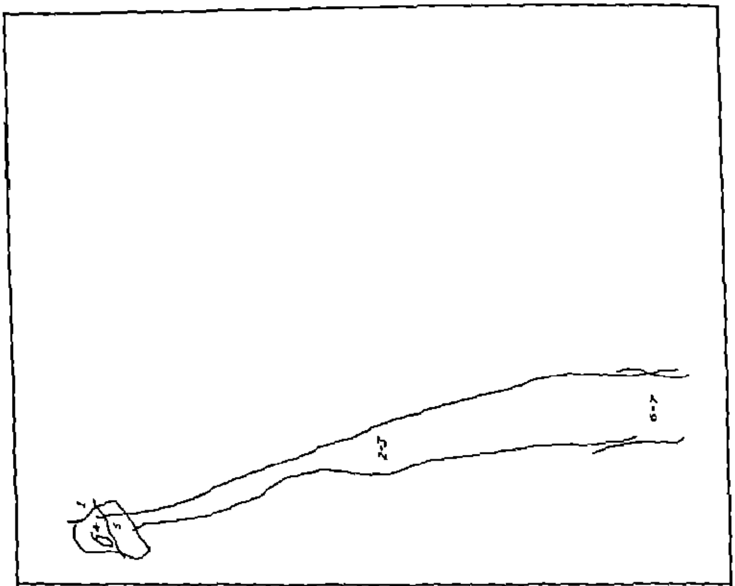
[105] See S2-3, Figure 27.
[106] See S2-2, Figure 27.
[107] See S11-6, Figure 28.
[108] See S7-3, Figure 28.
[109] See S14-9, Figure 29.
[110] See S14-4, Figure 29.
[111] See S8-7, Figure 7.
[112] See S13-9, Figure 13.
[113] See S5-1, Figure 10, and S5-3, Figure 11.



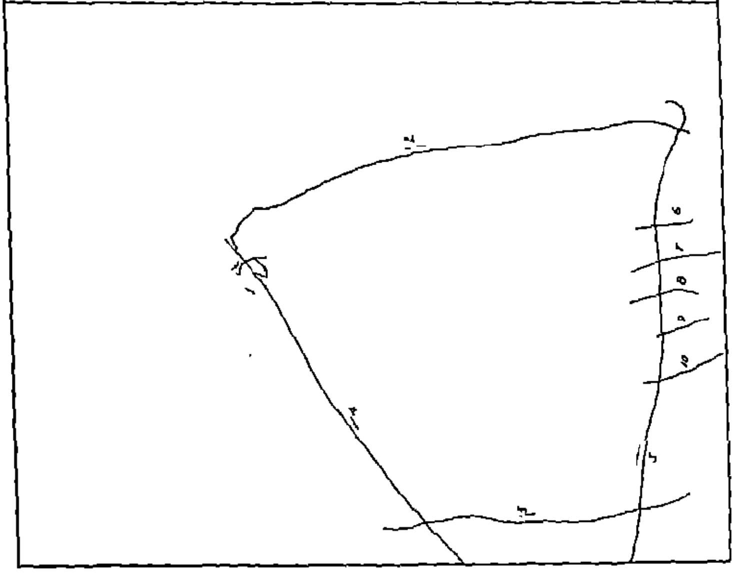

6
7
8
9
10

FIGURE 26

(*Left*)

SUBJECT 3

Situation 1: *Man.* 1st Day.
Record of Drawing:

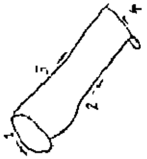
Lines 1-5
E: "What is it?"
"A lady."
Q. 1 "The lady's eye."
Q. 2 "That her feet."
Q. 3 "That her line."
Q. 4 "That gotta stay there."
Lines 6-10
Q. 6-10 "All her feet."

(*Right*)

SUBJECT 15

Situation 3: *Big Man.* 1st Day.
Record of Drawing:

Lines 1-7
Q. 1 "Big round thing what he has with."
E: "What is it?"
"Don't know."
Q. 2-3 "Feet."
Q. 4 "One eye."
Q. 5 "Mouth."


4
3
2
1

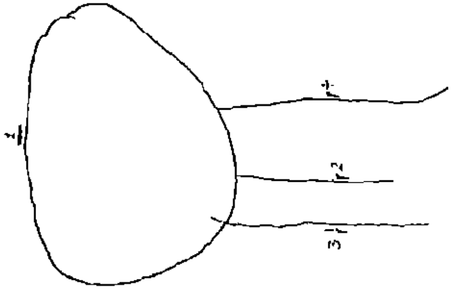

1
4
2
3

FIGURE 27

(*Left*)

SUBJECT 2

Situation 3: *Big Man.* 1st Day.
Record of Drawing:

Lines 1-4
Q. 1 "Face . . . head."
Q. 3 "Legs."
Q. 2 "Legs."
Q. 4 "The legs."

(*Right*)

SUBJECT 2

Situation 2: *Little Man.* 1st Day.
Record of Drawing:

Lines 1-4
Q. 1 "That's his face."
Q. 2 "That's clothes."
Q. 3 "That's clothes."
Q. 4 "Foots."

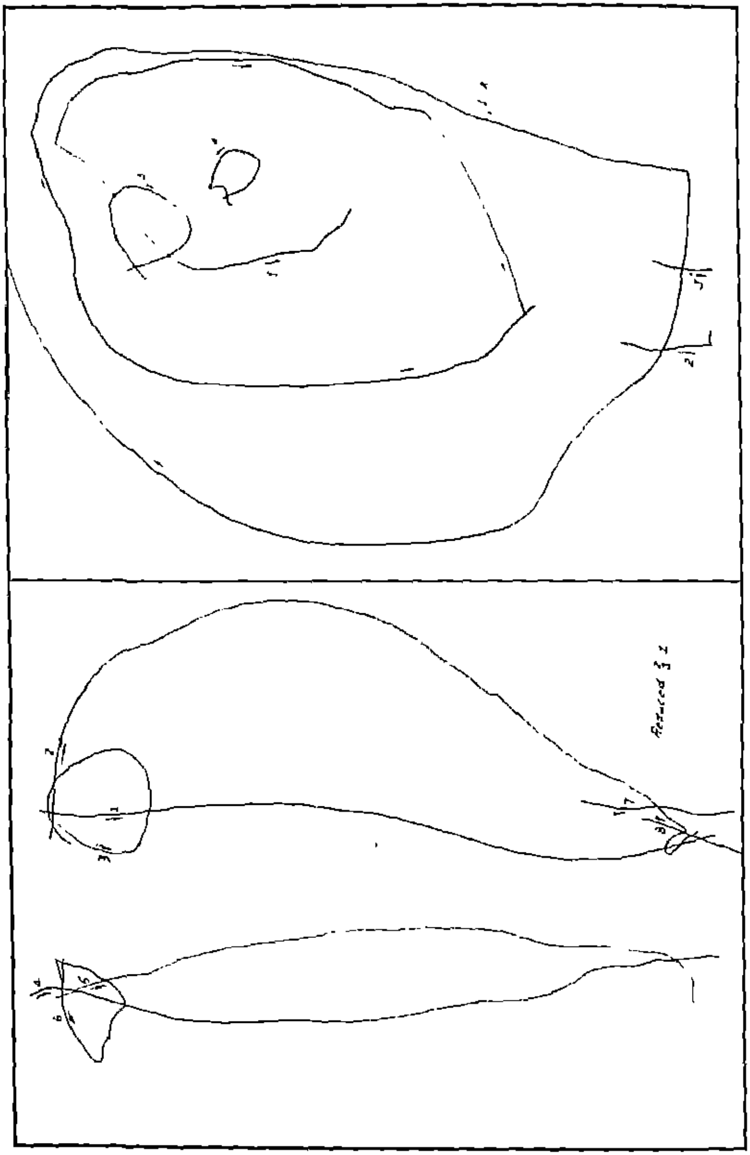

1
2
3
4
5
6
7
8
Reduced

FIGURE 28

(*Left*)

SUBJECT 11

Situation 6: *Big Man.* 2nd Day.

Record of Drawing:

Lines 1-3 "This is a big chicken."
Lines 4-6 "This is a man."
E: "Where is the man?"
"This is the man," pointing to left hand drawing.
"This is the girl," pointing to right hand drawing.
E: "What is this?" pointing to crossed lines, lower left hand drawing.
"His legs." "Oh, I didn't make her legs." Lines 7-8.
Q. 6 "Neck."

(*Right*)

SUBJECT 7

Situation 3: *Big Man.* 1st Day.

Record of Drawing:

Line 1 (a continuous spiral)
At *1A*, "I can make a great, big man."
E: "Is he all done?"
"Yah," but continues at once.
Line 2 "Make him foot."
Line 3
Lines 4-5 "Make him eye."

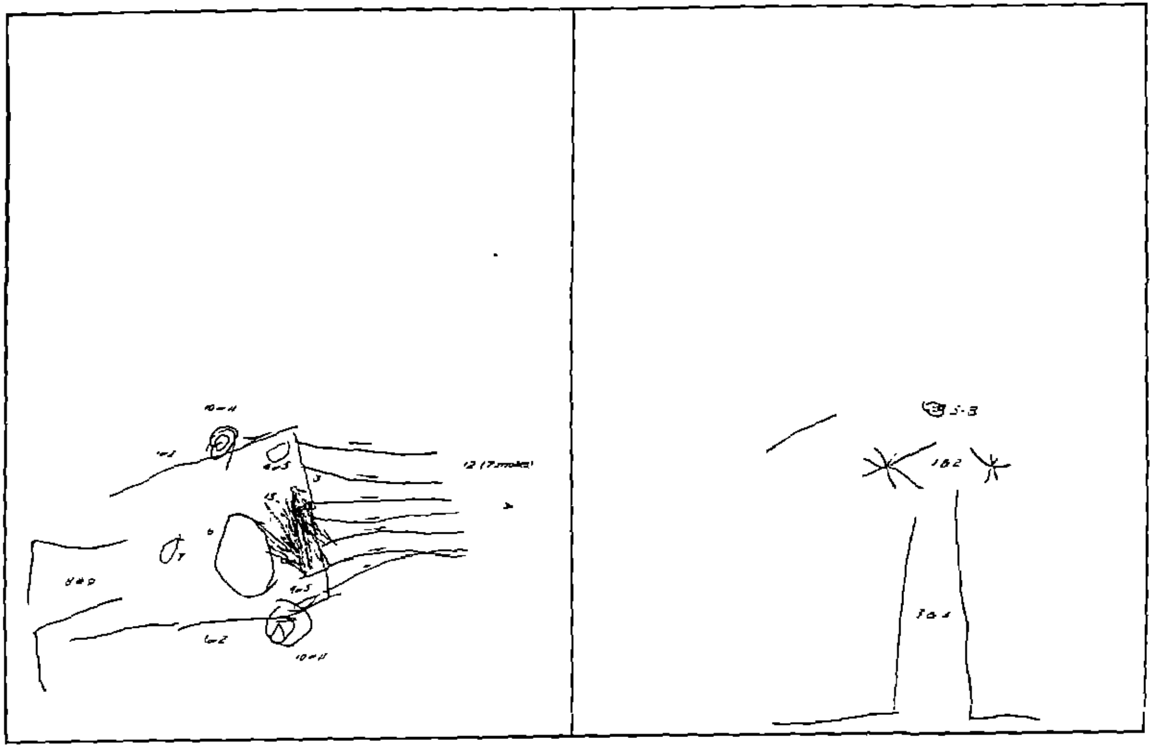

10=11
1=2
4=5
3
15
12 (17 marks)
A
6
7
8=9
4=5
1=2
10=11
5·3
1&2
3&4

FIGURE 29

(*Left*)

SUBJECT 14

Situation 4: *Man.* 2nd Day.

Record of Drawing:

Rotates 90 degrees counterclockwise before drawing; *A* becomes top.

Lines 1-12

Line 13 "Has to have something here. . . . Doesn't want it empty."

Q. 4-5 "Eyes."

Q. 6 "Mouth."

Q. 7 "Body."

Q. 8-9 "Legs."

Q. 10-11 "Ears."

Q. 12 "Hair."

Q. 7_2 "Eye . . . No! Body."

(*Right*)

SUBJECT 14

Situation 9: *Man from Description.* 2nd Day.

Record of Drawing:

Listened attentively.

Lines 1-2

Paused; appeared to be thinking.

"He had big, long legs."

Lines 3-4

Lines 5-8 "There's his little bit of a head. . . . Did he look like that? We don't need to finish him. He's all right that way."

TABLE 19

GRAPHIC AND VERBAL DIFFERENTIATION OF HEAD, LOWER LIMBS, AND TRUNK, GROUPED WITHIN THE FOUR DEVELOPMENTAL STAGES DESCRIBED BY *ROUMA*

Subjects		1								2								3								4							
Situations		1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Indicative stage	A. 1															x																	
	2																																
	B. 1																							x									
	2							x												x					x								
	3	x	x	x																													
Early representative stage	A.				x				x								x																
	B. 1 (a)																		x														
	(*b*)																				x	x	x										
	(c)																																
	2 (a)																																
	(b)																																
	3 (a)																																
	(b)																																
Tadpole stage	A.													x	x			x											x	x	x	x	x
	B.					x	x					x	x													x	x	x					
	C.									x	x																						
Early transitional stage	A.																																
	B.																																
	C.																																

TABLE 19 (*continued*)

GRAPHIC AND VERBAL DIFFERENTIATION OF HEAD, LOWER LIMBS, AND TRUNK, GROUPED WITHIN THE FOUR DEVELOPMENTAL STAGES DESCRIBED BY ROUMA

Subjects		5								6								7								8							
Situations		1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Indicative stage	A. 1							x	x					x	x		x																
	2												x																				
	B. 1										x	x																					
	2									x																							
	3						x																										
Early representative stage	A.																																
	B. 1 (a)															x								x									
	(b)																					x											
	(c)																														x		
	2 (a)																	x					x										
	(b)																																
	3 (a)				x																												
	(b)																																
Tadpole stage	A.		x			x													x						x	x	x	x	x	x			x
	B.																				x												
	C.																																
Early transitional stage	A.																			x													
	B.																															x	
	C.	x		x																													

Note: For key to subdivisions within the four stages see text.

TABLE 19 (*continued*)

GRAPHIC AND VERBAL DIFFERENTIATION OF HEAD, LOWER LIMBS, AND TRUNK, GROUPED WITHIN THE FOUR DEVELOPMENTAL STAGES DESCRIBED BY ROUMA

Subjects		9								10								11								12							
Situations		1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Indicative stage	A. 1										x	x	x	x		x											x		x				
	2									x							x																
	B. 1			x																x	x			x		x		x		x	x	x	
	2																					x											
	3		x		x			x																									
Early representative stage	A.	x				x	x								x																		
	B. 1 (a)																																
	(b)																																
	(c)																																
	2 (a)																	x	x														
	(b)								x																								x
	3 (a)																																
	(b)																																
Tadpole stage	A.																																
	B.																																
	C.																																
Early transitional stage	A.																						x		x								
	B.																																
	C.																																

TABLE 19 (*continued*)

GRAPHIC AND VERBAL DIFFERENTIATION OF HEAD, LOWER LIMBS, AND TRUNK, GROUPED WITHIN THE FOUR DEVELOPMENTAL STAGES DESCRIBED BY ROUMA

Subjects		13								14								15								16							
Situations		1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9	1	2	3	4	5	6	7	9
Indicative stage	A. 1				x																												
	2																																
	B. 1						x																										
	2																																
	3																																
Early representative stage	A.																									x							
	B. 1 (a)																											x					
	(b)																												x				
	(c)									x																							
	2 (a)																																
	(b)																														x		
	3 (a)										x	x																					
	(b)														x																		
Tadpole stage	A.							x								x		x		x				x	x								x
	B.	x	x	x		x													x		x											x	
	C.																																
Early transitional stage	A.																x										x						
	B.								x				x																				
	C.																																

Note: For key to subdivisions within the four stages see text. Situation 5 was omitted in the case of Subjects 14, 15, 16, and Situation 6 in the case of Subject 15.

subdivisions within them are given in Table 19 for all drawings of the series exclusive of Situation 8. Findings in the "Man on Dictation" will be given below. The distribution appears to be but little affected if at all by the verbal instructions or special conditions operating in the several situations (Table 20). The frequencies for the "Little Man" and the "Big Man" approximate those for the "Man" and the distribution on the second day is highly similar to that on the first. With two exceptions the frequencies for Situations 7 and 9 fall within the range of the first six situations. There is a slight increase in the percentage of indicative drawings in Situation 7 and in those of the transitional stage in Situation 9, but in view of the variability within the first six situations the differences are too small to be attributed to the special conditions imposed.

Analysis of the child's explanation of each graphic form has revealed more clearly than can the graphic record alone the steps in the gradual differentiation of the basal form into parts.

In drawings of the indicative period the basal is all inclusive; in it the child sees the entire man. He may designate it as "the man," or he may call it by the name of one of the parts which he sees within it, or he may specifically designate several of its segments by the names of several of the parts which it includes. When the basal is broken into two graphically differentiated parts the segment given a separate graphic form may represent a single part of the body or several parts. It may represent legs and trunk, or legs alone. The basal is still present and contains within itself all parts not represented in the newly differentiated segment. The child may still call the basal "the man," or may verbally differentiate segments of its circumference by the names of the included parts, or, when asked to name it, may show confusion by calling it "his line" or "the line that goes up to the feet." This confusion is understandable if the basal is seen as a whole which includes all parts not yet given a clear graphic differentiation.

In several "tadpole" drawings one finds an apparent desire for closure of the newly differentiated lower limbs. In S16-9 the man consists of two vertical legs attached to a circle enclosing the facial features.[114] After the sheet has been removed by the examiner the subject asks for its return. With the comment, "like a bridge," he

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[114] See S16-9, Figure 30.

TABLE 20

THE PERCENTAGE OF DRAWINGS IN EACH OF THE DRAWING SITUATIONS GROUPED WITHIN THE FOUR DEVELOPMENTAL STAGES

Stages of development	Situations								Averages					
	1	2	3	4	5	6	7	9	Sits. 1, 2, 3 1st Day	Sits. 4, 5, 6 2nd Day	Sits. 1 & 4 "Man"	Sits. 2 & 5 "Little Man"	Sits. 3 & 6 "Big Man"	Entire Series
Indicative	25	31	44	38	31	27	50	25	33	32	32	31	36	34
Early representative	31	19	13	25	23	47	13	25	21	32	28	21	30	25
Tadpole	38	44	31	31	46	20	31	31	38	32	35	45	26	34
Early transitional	6	6	13	6	0	7	6	19	8	4	6	3	10	8

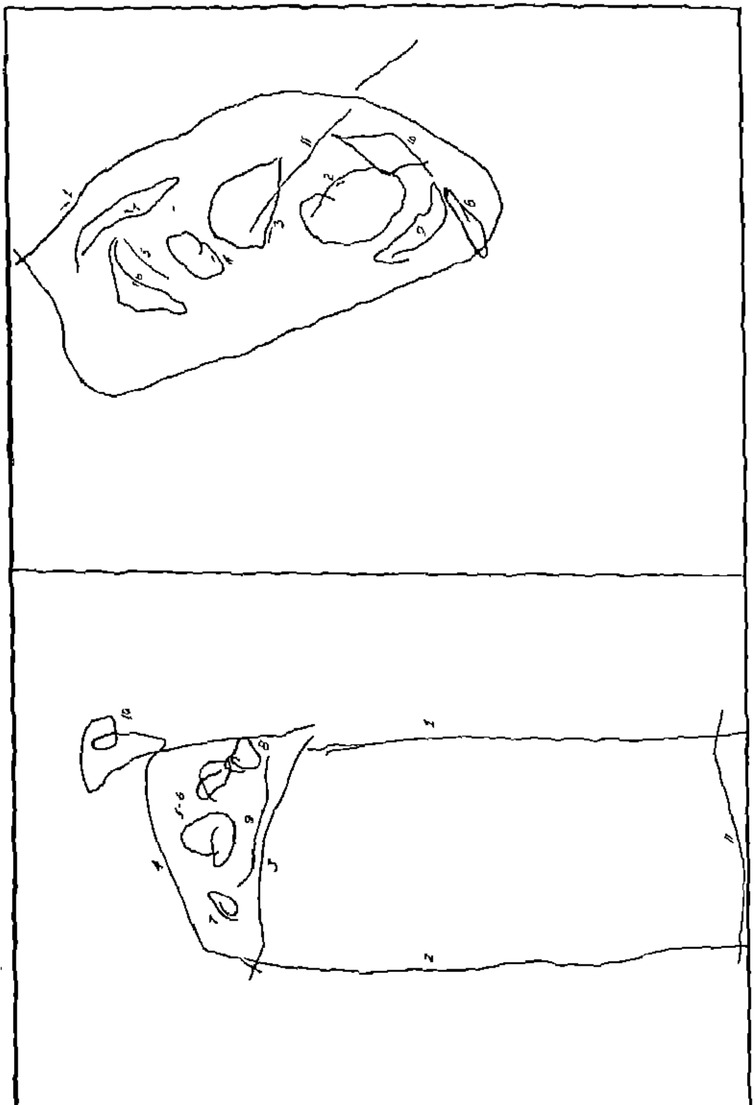

FIGURE 30

(*Left*)

SUBJECT 16.

Situation 9: *Man from Description.* 2nd Day.

Record of Drawing:

Showed keen interest in description. Then described a man he had seen, giving a number of details including "little face." Pointed to various parts of his own body in illustration. *E* repeated the description.

Lines 1-2	"Legs."
Lines 3-4	
Lines 5-6	"Eyes."
Line 7	"Nose."
Line 8	"Other nose."
Line 9	"Mouth."
Line 10	"Kite."
Q. 4	Refused to name. As *E* removed drawing he reached for it.
Line 11	
Q. 11	"Like a bridge."

(*Right*)

SUBJECT 6

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Line 1
Eyes	Lines 2-3
Nose	Line 4
Mouth	Line 5
Stomach	Line 6
Legs	Lines 7-10
Feet	"I did . . . two feet," pointing to 8 and 10.
Arms	Line 11. Pencil breaks. Is supplied with another and request repeated. Points to 8 and 10, "Here his arms."

Starts dense scribble across center of drawing. *E* requests in turn hands, ears, and hair. Continues scribble until drawing is nearly obliterated. Could be reconstructed only with the help of the observer's copy.

draws a horizontal line joining the legs at their lower extremities. In previous drawings by this subject in which there is no graphic differentiation of the lower limbs, the vertical sides of the basal are verbally differentiated as "legs" or "feet."[115] Subject 2 in three drawings joins the legs at the foot-end by a horizontal[116] line; in three additional drawings he extends the legs to the lower edge of the sheet, using the border of the paper as a substitute means of closure. Similarly, in a drawing of the early representative stage[117] the subject comments, "Now I'm going to close his legs," as she differentiates the basal from the scribbled head above. This final connecting line may be considered a remnant of an earlier stage, a survival of the all-encircling basal form.

As graphic differentiation increases, the configuration of parts gradually assumes the role of the basal as a symbol for the whole. When the third period of development described by Rouma has been attained, that in which there is complete representation of the human figure as seen in full face, the basal is no longer represented as a separate graphic entity. The gross divisions of the body—head, trunk, lower limbs, upper limbs, facial and head features—are all graphically differentiated one from another. The whole is represented through the synthesis and orientation of its several parts. This whole has superseded the basal. There is no longer a part of the drawing which is called "the man," a part which carries the concept of the whole and within which several parts are seen and intended by the child though graphically undifferentiated.

The trunk may to some extent retain the all-inclusive quality of the basal. A child of five and one-half years, to whom the various drawing situations were presented, called the trunk "his whole self" or "the rest of him." As Luquet (17, p. 692) has pointed out, the verbal symbols for this part of the body are vague even in adult speech. "Trunk" is an uncommon word and the term *body* lacks specificity. It is variously used to designate the whole man, or the whole minus the legs, or the whole minus the head, or the trunk alone. Even in adult thought the symbol for a part is not always clearly differentiated from the symbol for the whole.

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[115] See S16-4, Figure 4.

[116] See S2-2, Figure 27.

[117] See S12-9, Figure 9.

The difficulty experienced by our subjects in graphically differentiating whole into parts and recreating a whole through the synthesis of these parts is shown most clearly in the "Man on Dictation." The examiner's instructions require the drawing of one part at a time. They encourage differentiation and discourage the representation of the concept of wholeness as a separate graphic entity. We find, however, that the basal persists. Either the head, or the lower limbs, or even the hair may assume its role as the drawing progresses. Since the parts are named by the examiner rather than by the child there is no part which is called "the man," no part which lacks a verbal designation, no graphic form which is verbally differentiated into parts. These verbal indices of the basal are lacking, but analysis of the drawing itself and of the child's pointing yields numerous and varied clues to its presence.

A. THE HEAD ASSUMES THE ROLE OF THE BASAL

1. *All parts are enclosed within its borders.* The large circle drawn in response to the request to "make his head" encloses all subsequent parts, indicated by many isolated circles and lines, in jumbled orientation.[118]

2. *All parts except the upper limbs are either identified with the head or placed within it.* Segments of the head are pointed out when stomach, legs, and hair are called for. Facial features, ears, and feet are drawn within it in jumbled orientation; arms and hands extend in part beyond its circumference.[119]

3. *All parts except the upper and lower limbs are placed within it.* The parts are well oriented one to another, indicated by dots and dashes and scribbled lines. The limbs extend in part beyond its borders.[120]

4. *The trunk is identified with the head.* When the stomach is called for Subject 7 points to the head, Subject 9 scribbles over it, Subjects 5 and 15 look confused and refuse to continue, Subject 2 interprets the instructions as a request to start again. He draws a second circle to the left of the head and when legs are called for attaches two legs to each of the circles, thus producing two separate "tadpole" figures.[121]

5. *The trunk is drawn as a separate form placed inside the head.*[122]

B. THE LEGS ASSUME THE ROLE OF THE BASAL

The legs are drawn as vertical lines extending downward from the

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[118] See S6-8, Figure 30.
[119] See S16-8, Figure 31.
[120] See S3-8, Figure 31.
[121] See S2-8, Figure 32.
[122] See S8-8, Figure 32.

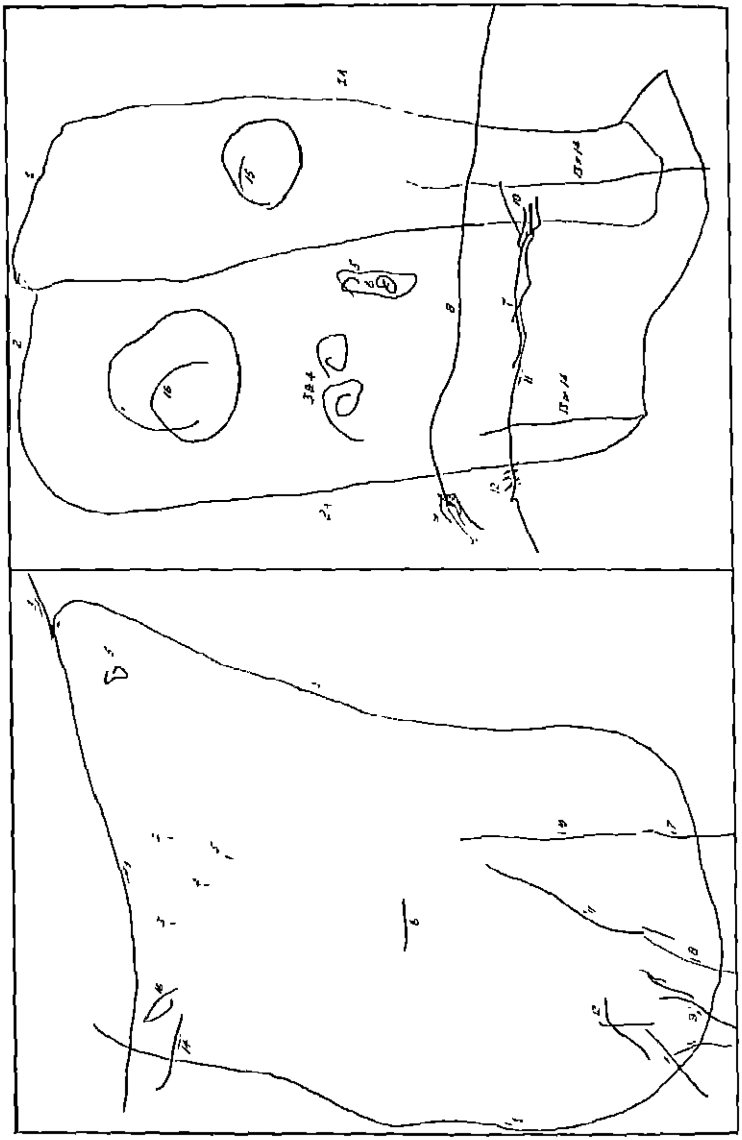

15
16
3 & 4
8

FIGURE 31

(Left)

SUBJECT 3.

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Line 1
Eyes	Lines 2-3 (dots)
Nose	Lines 4-5 (dots)
Mouth	"Me did." Points to 5.
Stomach	Line 6.
Legs	Lines 7-9 (and others to left) Q. 9 "There him feet." E: "Where are his legs?" Lines 10-11.
Feet	Line 12
Arms	Lines 13-14
Hands	Points to 13-14
Ears	Lines 15-16
Hair	"Me can't." Made circular motion over whole page. *E* repeats request to draw hair. Made circular motion in region of legs and feet.

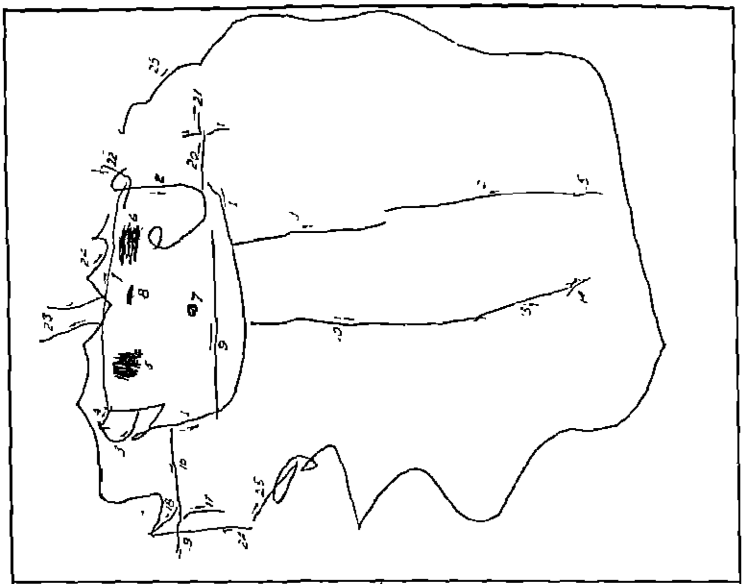
(Right)

SUBJECT 16.

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Line 1 "His head." Line 2 "Another head."
Eyes	Lines 3-4
Nose	Line 5 Laughed. Line *6*. "I made something in it."
Mouth	Line 7
Stomach	"There's his stomach," pointing to upper portion of space enclosed by Line 2.
Legs	"There's his legs," pointing to 1*A* and 2*A*.
Arms	Line 8
Hands	Line 9 (with attached fingers) Line 10 (four lines radiating from Line 7). He then picked up one of these finger lines and extended it into Line 11. Line 12.
Feet	Lines 13-14
Ears	Lines 15-16
Hair	Pointed to upper portion of space enclosed by Line 1. "That's his hair."



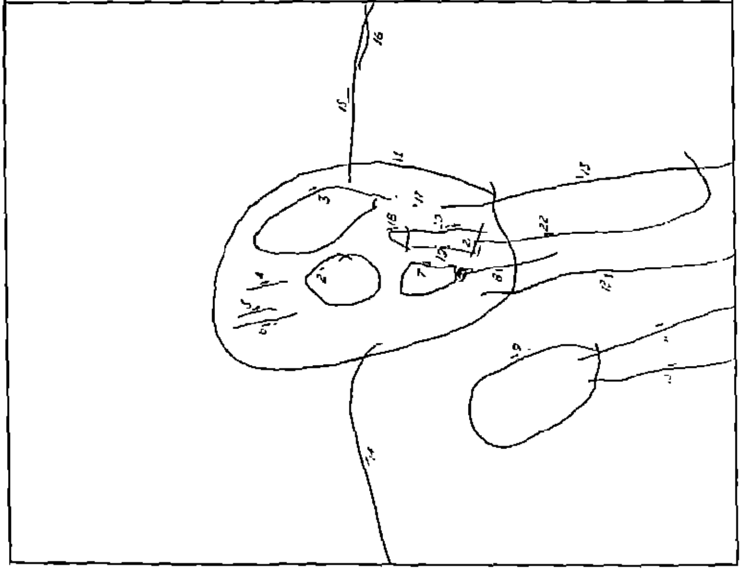


FIGURE 32

(*Left*)

SUBJECT 2.

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Line 1 "That's the head."
Eyes	Lines 2-3
Nose	Lines 4-6
Mouth	Lines 7-8 Q. 8 "A bottle of milk."
Stomach	Line 9
Legs	Lines 10-13 Q. 10-11 "Legs." Q. 12-13 "Legs."
Feet	Pointed to Line 13. "This is the man's feet."
Arms	Lines 14-16.
Hands	Points to outer end of Line 14, "That's his hands." *Q.* 16 "Hands."
Ears	Lines 17 (dot) and 18.
Hair	Lines 19-21 Q. 19-21 "A train, a train across." *E*: "Where is his hair?" Line 22.

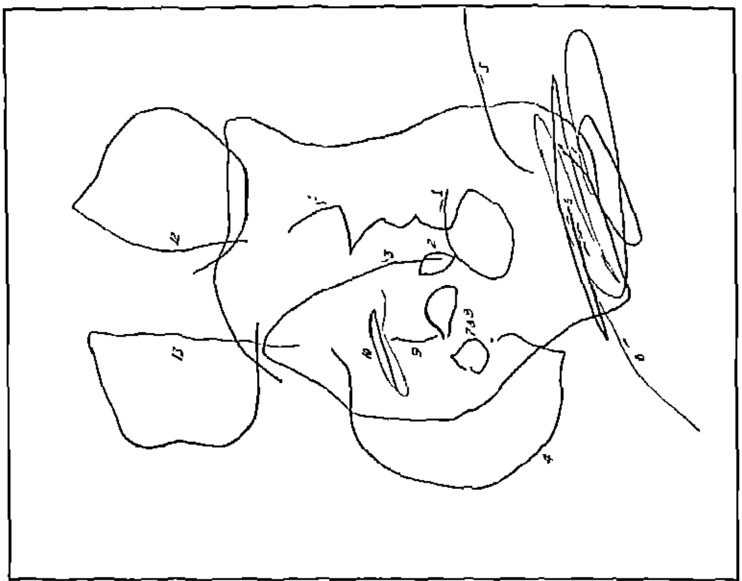
(*Right*)

SUBJECT 8.

Situation 8: *Man on Dictation.* 2nd Day.

Record of Drawing:

Head	Lines 1-4
Eyes	Line 5 "He's gonna have big eyes." "Now I'll make the other eye." Line 6.
Nose	"I make his stomach first." Line 7; then Line 8.
Mouth	Line 9
Stomach	"There it is," pointing to Line 7.
Legs	Starts 10 before E's request. Lines 10-13.
Feet	"I did already." Points to 12-13.
Toes	"I made toes already." Adds 14-15. "There's his toes."
Arms	"I forgot to make arms." Lines 16-21.
Hands	"I did."
Ears	Line 22 "Oh, and the hair." Draws 23, then 24-25. "I made curly hair all around."



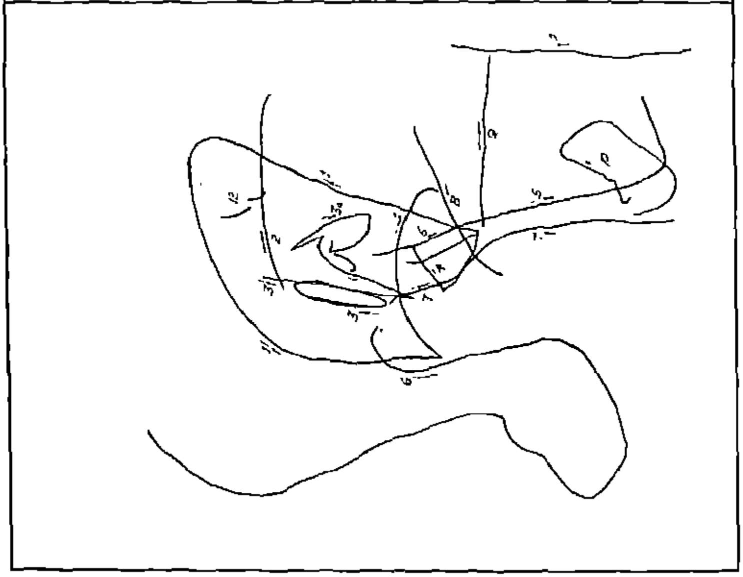


FIGURE 33

(*Left*)

SUBJECT 1.

Situation 8: *Man on Dictation.* 2nd Day.
Record of Drawing:

Head	Line 1
Eyes	Line 2
Nose	Line 3
Mouth	Pointed to 3*A*, " That's his mouth."
Stomach	"I don't know where you put the stomach." Drew Line 4, very lightly.
Legs	"Oh, I can't draw it, I don't know how." Lines 5-6.
Feet	Points to bottom of Line 5, "There they are."
Arms	"Oh, I can't!" Lines 7-8. "Two of them."
Hands	Line 9, "Them are them."
Ears	"I don't know." Line 10.
Hair	"I don't know how." Line 11. "Hair." Line 12. "Hair."

(*Right*)

SUBJECT 13.

Situation 8: *Man on Dictation.* 2nd Day.
Record of Drawing:

Head	Line 1
Stomach	Line 2
Legs	Lines 3-4
Arms	Lines 5-6
Eyes	Lines 7-8
Nose	Line 9
Mouth	Line 10
Hair	Line 11
Feet	Lines 12-13
Hands	Not requested
Ears	Not requested
Q. 11	"Head."
Q. 1	"Eye."
Q. 12-13	"Legs."
Q. 4	"Arm."
Q. 2	"Head."
Q. 5	"Head."

head[123] or stomach[124] and are then extended in a circular form enclosing all previously drawn parts. In the case of Subject 13 the circle is completed and closed; in the case of Subject 1 it is terminated as a semi-circle interrupted perhaps by the examiner's request to draw the feet. It is noteworthy that in both cases the trunk has been drawn as a separate form outside and below the head. The circular legs serve to assimilate these parts into a whole.

C. The Hair is Extended to Encircle All Previously Drawn Parts

The desire for closure, for expressing the idea that all parts of the man constitute a whole, is shown by Subject 8 when, after completion of[125] the drawing, she adds "curly hair" as a circle which frames the entire man.

The failure to distinguish the parts which compose the upper and lower limbs observed both in the man completions and in pointing out parts of the child's own body, as well as in the drawing series, is repeated in the "Man on Dictation." Several subjects anticipate the request for feet, drawing both the vertical leg and the horizontal foot when legs are called for.[126] Others identify legs and feet, pointing, when the feet are requested, to the undifferentiated vertical lines previously drawn to represent legs.[127] Similarly three children anticipate the request for hands, drawing both arms and hands when arms are called for,[128] and two identify these parts, pointing to the previously drawn arms when hands are requested.[127] It is uncertain whether lack of graphic differentiation is due to a failure to understand the instructions because of confusion in the verbal symbols or whether both verbal and graphic symbols lack specificity because the distinction between whole and part is not clearly made in the child's concept of a man.

The variability within the drawings of an individual revealed in all phases of our analysis is equally striking when the drawings are grouped according to their general representative value within the developmental stages described by Rouma and further classified in accordance with the verbal differentiation of parts revealed by study

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[123] See S1-8, Figure 33.
[124] See S13-8, Figure 33.
[125] See S8-8, Figure 32.
[126] See S14-8, Figure 15.
[127] See S2-8, Figure 32.
[128] See S8-8, Figure 32.

TABLE 21

THE NUMBER OF DEVELOPMENTAL STAGES AND OF SUBDIVISIONS WITHIN THESE STAGES FOUND WITHIN THE DRAWINGS OF AN INDIVIDUAL

Subjects	Number of stages		Number of subdivisions	
	Sits. 1 to 6	Entire series	Sits. 1 to 6	Entire series
1	3	3	3	4
2	1	3	3	5
3	3	3	4	5
4	1	1	2	2
5	4	4	4	5
6	1	2	4	5
7	3	3	5	6
8	2	3	2	3
9	2	2	3	4
10	2	2	3	3
11	3	3	4	4
12	1	2	2	3
13	2	3	3	5
14	2	3	4	6
15	1	1	2	2
16	2	3	5	7
Average	2.1	2.6	3.3	4.3

of the child's comments during the drawing process (Table 21). Within Situations 1 to 6 the average number of stages shown in the work of a single child is 2.1. All four stages are represented in the drawings of Subject 5 and 69 per cent of the subjects furnish examples of more than one stage. Within the entire series the average number is 2.6 and 88 per cent of the group alternate between two or more stages. The largest number of subdivisions shown is seven; the average is 4.3. Sixty-nine per cent of the subjects give examples of four or more subdivisions in the course of the series.

In evaluating the amount of variability within the subdivisions of a given stage it should be remembered that the verbal record is not complete. In the early drawings of the series the subject was urged to name each part, but if he showed irritation the question was not repeated. Furthermore when the same schema was used throughout the series, as in the case of Subject 4, naming was not invariably requested in the later drawings. There were frequent indications of annoyance on the part of the child at the seemingly foolish questions of the examiner, either when he was unable to differentiate verbally the part he had drawn or when he had previously done so. Completeness of the verbal record was sacrificed to maintain the subject's cooperation for later situations. For this reason the variability between subdivisions within a given stage may in some cases be spuriously high. In the case of Subject 4, for example, all drawings of the series might fall within the second division of the "tadpole" stage, had a verbal response been forced.

On the other hand the variability shown may in some cases be less than would have been found had there been a more uniform and more detailed questioning of the child concerning segments of the basal. Prior to analysis of the data the importance of the verbal differentiation of a graphically undifferentiated form was not recognized. There was lack of uniformity in the segment of a given part which the examiner touched when, after completion of the drawing, the child was asked, "What is that?" Only in those cases in which the observer recorded the specific segment which the child or the examiner pointed out can this segmental verbal differentiation be analyzed.

The fluctuation from one developmental stage to another and from one subdivision to another, the alternation between attention to the whole and attention to detail, is not surprising in view of the findings in the biographical studies. The same variability found by Eng(5)within the spontaneous drawings of her niece over a period of days, weeks, or months is revealed within the short period of the two experimental sittings and is perhaps intensified by the conditions of the series. The recurrent return to scribblings, non-representative in both orientation and form, after a higher stage of development has been attained, may be an expression of the same "intentional practice" noted by Eng, an expression of the tendency to experiment in new modes of graphic representation.

In tracing the developmental sequence in the differentiation of parts within the whole in this nascent period of representative drawing, one is struck by a resemblance between drawing development and certain facts of biological development. Such analogies, if not pressed too far, may be of value as a reminder of the intricate and little known relationships between the growth of structure and the functioning of that structure in child behavior.

The early students of children's drawings call attention to a structural analogy by applying the names "cell stage" or "tadpole drawing" to the primitive circle with an indefinite number of appendages. Luquet likens the division of whole into parts to the differentiation of tissues in a living organism: the drawing is "a whole which expands, as it were, develops successively the elementary details which until that time were contained within it only potentially; the process consists of an internal division, an evolution in the Spencerian sense (progression from the homogeneous to the heterogeneous) analogous to the differentiation of tissues in the development of an embryo" (16, p. 111). The recent work of Coghill (4) showing certain relationships between the growth of structure and the functioning of that structure in primitive organisms suggests further analogies between biological development and drawing development.

Coghill has described the two longitudinal metabolic gradients which operate in the embryo of *Amblystoma* prior to the development of the nervous system (4, pp. 42-44). In the ectoderm the metabolic rate is highest in the forebrain, lower in the caudal region, and still lower in the midtrunk area. The mesodermal gradient falls rapidly from the tail-end headward. Head and tail are thus points of highest activity. Roma has shown that in the developmental sequence in children's drawings representation of general direction precedes that of form (23, pp. 31-32). The head-end is differentiated from the foot-end by a scribbled blocking out of the vertical limits of the figure. In the earliest "tadpole" drawings, the head-end is differentiated from the lower limbs by a variation in form. The trunk is the last of the major divisions of the body to be given complete graphic differentiation. Shall we think of the trunk as the point of "low metabolic activity" in the child's concept of a man?

Coghill (4) has demonstrated in the developing *Amblystoma* that partial patterns are individuated out of a primary total pattern. This is true both in the development of the early behavior patterns and in the development of the mechanism, both preneural and neural, which determines these early behavior forms. Our evidence suggests that in the child's drawing of a man the various parts of the body are gradually differentiated from out an encircling basal form, and that prior to graphic differentiation the several parts are "seen and intended" by the child within the encircling whole. Coghill has pointed out "that the individuation of a partial pattern or local reflex within the total pattern is anticipated in the central nervous system by the growth of a nervous organization with specific reference to that partial pattern long before the latter makes its appearance in behavior" (4, p. 91). This neural overgrowth found in both motor and association systems he terms a "forward reference." In the drawings of our experimental series the verbal differentiation of parts within a graphically undifferentiated form gives the clue to an underlying visual differentiation which is in fact a "forward reference," a preparation for the graphic differentiation of these parts in drawings of a later developmental stage.

These analogies between the development of primitive neural and behavior patterns and the development of graphic differentiation of parts in a child's drawing of a man suggest that the latter is conditioned by underlying principles of developmental mechanics.

IV. SUMMARY

Analysis of the four-year-old child's drawings of a man in a series of nine prescribed situations yields results which may be summarized under two headings: (*a*) Certain general characteristics of drawing behavior, in this period of transition between scribble and recognizable graphic representation, which persist throughout the series, and (*b*) the influence upon both the graphic patterns and the associated postural behavior of the child of the specific instructions and varying conditions imposed in the several situations.

A. GENERAL CHARACTERISTICS OF DRAWING BEHAVIOR PRESENT THROUGHOUT THE EXPERIMENTAL SERIES

1. *The Dominance of the Representation of the Whole over that of the Parts.*

a. The difficulties encountered in determining what part of the body the child has attempted to represent by a given graphic form suggest that many of these forms are intended to represent more than one part.

(1). That visual appearance alone is an inadequate indicator of the child's intention is shown by the disagreement between judges when the drawings are scored by the Goodenough scale for the measurement of intelligence by drawing.

(2). That the child's naming of the graphic forms cannot be taken as the sole criterion for determining the parts represented is evident from the following facts:

(*a*). The verbal symbols for certain parts of the body are not clearly differentiated when the child points out parts of his own body on request.

(*b*). Naming of the graphic forms is often inconsistent with both visual appearance and previous naming.

(*c*). The child may be hesitant and confused when he attempts to find a name for a form which he has drawn.

(*d*). A graphically undifferentiated form may be verbally divided into parts by assigning the names of various parts of the body to segments of its circumference.

b. These difficulties lead to the hypothesis that in all drawings, prior to that stage of development in which the major divisions of the body are given separate graphic representation, some one of the graphic forms carries the concept of the whole and is intended to represent the residue of parts not graphically differentiated one from another.

c. This hypothesis of basal form is supported by two lines of evidence:

(1). Verbal differentiation within a graphically undifferentiated form is found to anticipate subsequent graphic differentiation. When the drawings are grouped within the developmental stages described by Rouma, and further classified according to the mode of representing the head, lower limbs, and trunk within these stages, it is found that in drawings of each stage the child's naming reveals a verbal differentiation of parts within a single graphic form which foreshadows the graphic differentiation of a subsequent stage. This "forward reference" reveals, more clearly than can the graphic record alone, the gradual differentiation of parts from out a primitive all-inclusive basal form and the transfer of the concept of wholeness from this primitive basal to the configuration of differentiated parts.

(2). Remnants of the basal are found to persist in drawings in which the parts are given separate graphic representation.

(*a*). A segment of the basal may be designated by the name of a part of the body in the same drawing in which the part in question has been represented by a separate graphic form.

(*b*). The drawing may be terminated by a connecting line which unites the previously differentiated parts or by an encircling frame which resembles the primitive all-inclusive basal form.

(*c*). In the "Man on Dictation," in which maximum differentiation is secured by dictating one by one the parts to be drawn, the concept of wholeness may be given graphic expression, either by enclosing all previously drawn parts within an encircling form, or by placing all subsequent parts within the form originally drawn to represent the head.

2. *Variability of Performance within the Drawings of an Individual.*

a. Within the nine drawings secured from each child there is variability of performance in the following aspects of behavior, which are shown by group averages to be influenced but little if at all by the specific conditions imposed in any one of the several drawing situations, exclusive of the "Man on Dictation."

(1). The differentiation of parts from out the basal form.
  (*a*). The number of parts of the body given separate graphic representation.
  (*b*). The parts chosen to represent a man.
  (*c*). The temporal order in which the parts are drawn.
(2). The synthesis of parts within the total configuration.
  (*a*). The attachment of the parts.
  (*b*). The mutual orientation of the parts.
(3). The orientation of the total figure in relation to the child.
  (*a*). During the drawing process.
  (*b*). Upon completion of the drawing.
(4). The mental age equivalent of the drawings.
(5). The stage of development which the graphic pattern exemplifies within the genetic sequence.

b. Since variability is often great between drawings which are approximately equal in general representative value and in completeness of performance, fluctuation of interest in the assigned task cannot be the sole causative factor in this lack of consistency within the drawings of an individual.

c. Much of the variability found may be interpreted as recurrent intentional practice and experimentation, comparable to that reported by Eng in the biographical study of her niece. The alternation between attention to the whole and attention to detail, the recurrent scribbling which precedes an advance in representative drawing, found by Eng over a period of days and weeks, are present within the course of the experimental series. The varying manipulation of both pencil and paper, and especially the postural behavior and running verbal comment during the drawing process, lend support to this interpretation.

d. To what extent this variability is a function of the series as a whole, although independent of the specific situation, and to what extent it is characteristic of the period of nascent graphic representation, is uncertain. The suggestion is made that a tendency toward experimentation, which is characteristic of the period, is intensified by the cumulative stimuli of the series of situations and that these combined factors result in a degree of variability which neither factor alone would produce within the short time of the two experimental sittings.

B. INFLUENCE OF THE SPECIFIC INSTRUCTIONS AND VARYING CONDITIONS IMPOSED IN THE SEVERAL SITUATIONS

1. *Adaptation to the Verbal Suggestions Concerning the Size of the Total Figure and the Effect upon this Adaptation of a Change in the Size of the Paper.*

a. The examiner's instructions which suggest an increase or decrease in the size of the total drawing result in an average variation in both height and breadth in the required direction which is never less than 18 per cent of the size of the standard man.

b. The amount of adaptation to the verbal instructions, when these suggest a decrease in size, is not lessened by the counter suggestion toward an increase in size offered by an increase in the size of the paper.

c. The amount of variation in the required direction, when the instructions suggest an enlargement of the drawing, is increased fivefold by an increase in the size of the paper. Conditions are inadequate to show whether this increased variation is due solely to an increased adaptation to the examiner's instructions, made possible by the removal of the restriction imposed by the small sheet, or is partly the result of the stimulus of the large paper irrespective of the instructions.

2. *Modification of the Graphic Pattern by the Presence of a Visible Copy.*

a. The opportunity to copy the schematic picture of a man, which represents a stage of development but slightly in advance of that found in the spontaneous drawings of four-year-old children, has little if any effect upon the graphic pattern.

b. The following findings are suggestive of a general tendency, but the differences are too small to be attributed with any certainty to the conditions imposed:

(1). There is a slight decrease in the representative value of the drawings as judged by the number which fall within the indicative period of Rouma's classification.

(2). There is a slight increase in the number of new parts of the body represented, parts not previously drawn in the course of the series.

c. These findings suggest an increase in the tendency to experiment in new modes of graphic representation. It is uncertain whether this increase results from the multiplicity of suggestions, potentially present in the pictured man, or is a chance fluctuation in a tendency present throughout the series.

3. *Adaptation to the Examiner's Verbal Description of a "Funny Man" with a "Little Bit of a Head and Great Big Long Legs."*

a. An evaluation of the effect of the examiner's description upon the relative proportion of parts in the child's graphic pattern of a man is not possible, because of the incomplete and variable differentiation of parts from out the basal form.

b. The direction of attention toward head and legs appears to have a slight facilitating effect upon the representation of the lower limbs as a part distinct from the basal, but no effect upon the differentiation of the head. The verbal record as well as the graphic reveals a greater interest in the legs than in the head. This finding may be interpreted in terms of the degree of readiness for this differentiation in the child's spontaneous drawings. In the course of the series separate graphic representation of the head is rare, whereas the legs are drawn more frequently than is any other part.

4. *Modification of the Graphic Pattern which Occurs when the Parts of the Body to be Drawn are Dictated One by One.*

a. In the "Man on Dictation" there is a marked increase in the representative value of the drawing as determined by each of the following criteria:

(1). The joint measure of the differentiation and synthesis of parts of the body, made with the help of the child's comments.

(2). The average mental age equivalent of the drawings, when scored by the Goodenough scale.

b. The parts of the body chosen to represent the human figure, their mode of differentiation, and the errors made in the attachment and orientation of these parts are the same as in other situations. The superiority of the "Man on Dictation" is due not to a change in the method of representation, but to a more complete expression of the many relationships which together make up the child's concept of a man. In spontaneous drawings at this age the span of attention is exhausted after a fragmentary recording of a few of these relationships. The direction of attention toward the parts within the whole, and the serial reenforcement of attention by naming these parts, make it possible for the child to record in a single graphic pattern the multitude of relationships which without this help find expression only in a series of drawings.

Both the spontaneous variability which is independent of the specific situation and the positive adaptation to certain of the visual and verbal suggestions offered, demonstrate the absence of a set formula in this period of transition between scribble and recognizable graphic representation. There is no conventionalized configuration of lines which is automatically repeated in successive drawings. The child is exploring the newly recognized potentialities of paper and pencil and is trying out new modes of expressing the intricate relationships within his enlarging concept of a man.

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EDITED BY
CARL MURCHISON

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University of Minnesota

Charlotte Bühler
Universität, Wien

William H. Burnham
Clark University

Cyril Burt
University of London

Leonard Carmichael
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DIFFERENCES BETWEEN TWO GROUPS OF ADULT CRIMINALS*

RUTH SHERMAN TOLMAN

Los Angeles County Probation Department, Los Angeles, California

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I. INTRODUCTION

A. Orientation of Present Problem

Many attempts have been made to establish differentiae of criminality—differentiae which, it was often hoped, would prove etiologically significant or prognostically reliable. Although the results of these investigations have in many cases been vitiated by gross methodological unsoundness, they leave no doubt that definite correlations exist between criminal behavior and certain sociological, economic, psychological, and psychiatric factors. The great variety of such factors, and the relatively poor correlations often obtained, are themselves a clear indication of the extreme complexity of the problem, and show conclusively, as we should perhaps expect on quite general grounds, that the development of criminal behavior is not at all a unitary phenomenon, but depends upon the collaboration of many factors whose actual importance in specific cases requires careful analysis. Indeed, where such analyses of individual cases have been carried out, it has often been found that many etiologically relevant factors were so specific to the individual and so inaccessible to superficial investigation as to suggest the essential and very serious limitations of statistical studies. We cannot in fact hope by such studies to answer the question "What makes a man a criminal?" Rather such statistical studies can serve at best to show that certain characteristics of the individual and his environment and of their interaction must be regarded as relevant to the criminal situation.

The great complexity of the problem manifests itself strikingly in the variety of the lines of investigation which have led to increased insight, and which have given some promise of a partial explanation. Some of these lines of investigation have been very specialized and abstract, ignoring all but a few aspects of the problem. To this group belongs Lombroso's historically important study of the gross anatomical characteristics of the individual criminal, in particular his earlier work with its insistence upon "anthropological types" and certain "atavistic cranial anomalies" as characteristic of the criminal[1] (50, pp. 207-331), (51, *Introduction*). To this group also belong the more recent and sometimes more promising attempts to explain criminal behavior on the basis of the functioning of the endocrine glands. Such studies concern themselves both with the indirect operation of the glands in determining body build and temperament which might then be correlated with criminal behavior (as in applications of Kretschmer's "morphological types" to the classification of criminal populations), and with a more direct, but at present obscurely defined, influence on criminal conduct. The work of Kretschmer (43), Pende (61, pp. 33, 64 ff.), Michel (48, pp. 66, 67), Schlapp and Smith (70), Morris (57), Lurie (52), Grimberg (32), and the findings of Reynolds (63, p. 31) may be mentioned as such attempts. The results of these investigations are illuminating and suggestive, but in the present stage of endocrine research, they are far from conclusive. Somewhat less abstract, but suffering from inadequacies of test methods and absence of controls, have been the innumerable studies, beginning with Goddard (30, pp. 6-10), (31, pp. 73, 74), explaining criminal conduct chiefly in terms of mental defect. Sutherland (77) summarizes 350 of such studies, showing the wide variation in results, and emphasizing the finding that as test methods have improved and tests have been more widely applied to non-criminal groups, the tendency is for the reported proportion of individuals of low intelligence to rise in the general population and to decline in delinquent or criminal groups. An important approach to crime causation in terms of non-intellectual factors is furnished by the psychiatrists. At first their emphasis was on the high incidence of the "psychopathic personality" in groups of criminals, a condition of personality and character differing not qualitatively, but quantitatively from the normal (10, p. 10). Yet the absence of norms and the inclusion of the tendency toward criminal behavior itself as a part of the definition of psychopathy reduced the meaning and value of the findings. The most recent psychiatric interest is in the individual criminal as the resultant of interaction between a particularly constituted personality and a particular environment (26). Characterized by a highly technical methodology and corresponding technical concepts are the many recent and illuminating studies from the psychoanalytic point of view (2, 3, 4, 5, 6, 9, 13, 58, 81, 86), and it seems probable that these have influenced, at least in part, the shift in psychiatric emphasis.

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[1] In his later work it cannot be claimed that he ignored anything, giving serious consideration to everything from meteorological conditions to hair color as determinants of criminal behavior (51).

For the most part these methods stand in marked contrast to the type of investigation commonly used in the practical problems arising in connection with the proper disposition of criminal cases and with programs of probation and parole, and in the present study it has seemed desirable to try to develop methods which, while preserving some of the breadth and simplicity of those used in practice, could nevertheless be used for a more objective discussion and correlation of criminological problems. In the investigations of the probation officer, for example, a far greater range of potentially relevant factors is taken into account, but necessarily without the use of specialized or elaborate technical methods, and subject to limitations of time and reproducibility which often leave doubtful the objectivity of the conclusions. Hence in the present investigation, an attempt has been made to find reliable and, wherever appropriate, quantitative estimates of certain of the characteristics which are accessible to superficial psychological investigation, and whose possible relevance is suggested, not alone by practice, but also by the results of detailed psychiatric and in particular of psychoanalytic investigations which have been made.

The results of recent psychoanalytic studies suggest that the mechanisms underlying criminal behavior are to be understood in terms of emotional conflicts having their origins in most cases in disturbances of the so-called libidinal relationships within the family. The cleavage within the ego which engenders aggression and delinquency is caused by the imperfect solution of the relationship between the individual and the parents in early life, and may be fostered by an excess *either* of love or of severity, either of indulgence or of privation during this period. Although in neurotic criminals the content and character of the conflicts can in general be discovered only after protracted analysis, in individuals whose delinquency is symptomatic of aggressive personality drives, it is reasonable to expect that explicit conscious attitudes may be detected by the use of less penetrating psychological techniques. With this possibility in mind, we have made an effort in the present investigation to discover the individual's expression of his attitude toward his parents and his upbringing. From the point of view of psychoanalysis, we should, it is true, be prepared to find that in the individual whose primary drive to delinquency is neurotic, these deep lying factors would fail to come to any direct conscious expression and that they would be overlaid with distortions and equivocations. Nevertheless the results of our enquiry show that in certain cases, and perhaps in part as a consequence of the development of a criminal career, definite evidences appear for some of those attitudes which the analytic findings lead us to expect.

There is another set of considerations which has motivated the orientation of the present study, that of the social and economic factors. For as Levy has emphasized (49, pp. 199, 200), where an individual's environment is so grossly pathological that delinquency is his only recourse, personality and other factors are relatively unimportant. It would be impossible even to list the studies of this type, investigating poor home conditions (11, p. 72; 17, p. 66), (27, pp. 113, 241), overcrowding (17, p. 85; 35, pp. 291, 292; 59, p. 485), broken homes (8; 17, pp. 578-582; 21; 35, p. 290; 36, pp. 121-122; 72, pp. 271-284; 73, p. 713; 75, pp. 353 ff.), delinquency areas (11, pp. 150 ff.; 71), gangs (64, 83), and many other factors. The Glueck's studies (27, 28, 29) are the most thorough objective ones yet made from a sociological point of view, investigating after-careers of inmates of penal institutions. In "*Five Hundred Criminal Careers*" and "*Later Criminal Careers*" they consider 63 factors in relation to success or failure in adjustment during the first and second five-year follow-up periods.[2] Prognostic tables were constructed on the basis of their findings.[3] This same method, though with less meticulous verification of the sociological data used, has been followed by Burgess (15, 16), Laune (45, 46), Tibbetts (84, 85), Vold (88) and many others, using large numbers of cases, some arbitrary but objective criterion of "success" or "failure" on parole or probation, and some statistical measure of association.[4]

In most of the sociological studies, successful family and community relationships and good work habits, all viewed externally, appear as associated with successful later adjustment. The probation officer in his actual procedure depends essentially upon his evaluation of the integration of the criminal with society, as revealed by his record and his apparent attitude toward authority, the community, and work. But we find in the reported researches very little material on the criminal's own attitudes, and must depend chiefly upon a few biographies and scattered references in individual case studies to tell us how the criminal regards his own life. Of course, such investigations are on less firm ground than those dealing with the more objective aspects, and there are serious difficulties of method which we shall later consider. But there is a growing belief that the criminal's own statements may be accepted, at least tentatively, as representing his attitudes. It has seemed promising, then, to investigate and analyze some of the alleged attitudes of the individual which might plausibly accompany certain of the social factors. Is there to be found in the individual with established criminal habits greater dissatisfaction with the community in which he lives, with his work, with the prevailing economic and political regime? Is there present a greater feeling of isolation from his fellows, a greater amount of resentment at society and of antagonism toward authority? Do his descriptions of parental relationships suggest greater reserve and the presence of antagonism more often than do those of a suitably chosen control group? Are his expressions of affect toward wife or children markedly different?

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[2] "Considerably" associated with behavior during the post-Reformatory periods were the following: pre-Reformatory work habits, the seriousness and frequency of early criminality, economic responsibility preceding sentence, mental abnormality at time of sentence, frequency of offenses in the Reformatory and during parole, family relationships, use of leisure time.

The factor of aging or maturation emerges as the only one of statistical "significance," however, in the reformative process when the careers are examined at the end of 10 years. No other of the 63 factors included in the research appeared to have any significant influence on reformation, though certain ones, such as mental abnormality, operated as impediments to reformation (28, ch. 9, 10).

[3] These tables and the statistical methods underlying them have been criticized by Elkind and Taylor (23, pp. 548, 549).

[4] Often Yule's coefficient of contingency.

To recapitulate, the present study is an attempt chiefly to explore those conscious attitudes, more peripheral than the findings of psychoanalysis, less peripheral than those of the sociologists, which might reasonably be expected to be present as counterparts of their findings. We have looked for evidence of disturbances in relationships to the parents and have attempted to examine those reactions toward the community and toward other individuals for which the term "sociotropic" might be suggested.

B. METHODOLOGICAL CONSIDERATIONS

In such an attempt, however, certain difficulties are inescapable:

1. In the definition of "crime" there are many ambiguities. Even if we accept the arbitrary criteria afforded by legal classifications, the vagaries of our systems of apprehension of law violators leave much doubt as to the purity of criminal groups. For the criminal

is, in the end, the individual who is caught and convicted, and this limitation needs always to be borne in mind.[5]

2. Closely related to this is the difficulty of the selection of cases, in particular the problem of the so-called "control" group. It can be convincingly argued that no rigorous control group can ever exist for any investigation of human behavior, but in the realm of criminal conduct the obstacles to the selection of even reasonably good controls are especially great. In other studies the problem has been met in various ways. In the case of juvenile studies it is relatively simple to select one group of boys (or girls) in a State School for delinquents and one of comparable age in another school, assuming that the influences introduced at the schools for delinquents resemble sufficiently those disciplinary procedures present in all schools to make them negligible factors. This method has been used by Burt (17), Cady (18), Casselberry (19), Covert (20), Cushing and Ruch (22), Gilliland and Eberhart (25), Laslett (44), Raubenheimer (65), Reinhardt and Harper (66), Thomas (82) and many other investigators. Another basis of selection is employed by the Gluecks[6] in both their juvenile and adult studies (27, 28, 29). Here it is the subsequent history of success or failure which locates the individual in one group or the other, and this has the merit of equating to some degree the reformatory or industrial school experiences of the two groups. This type of selection is also used by Burgess (15, 16), Vold (88), Monachesi (56), Hart (33), and most of those sociologists whose work has been mentioned. Stevens (76, p. 280) uses college freshmen of comparable age as a control group for his study of autobiographical data from 100 recidivists. Healy and Bronner's most recent study (37, pp. 23, 24) carried out over several years simultaneously in Boston, Detroit, and New Haven employs a most careful and ingenious selection of a control group. They deal with 105 delinquents paired with non-delinquent siblings, including eight pairs of twins. The attempt was made to select a sibling of the same sex and as close as possible in age to the delinquent. The attempts to meet this difficulty in the present investigation will be described in Part II, Selection of Cases.

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[5] This problem is considered in detail by Robinson, S., in a recent study "*Can Delinquency Be Measured?*" (67).

[6] The Gluecks' studies have been criticized for the lack of control groups for purposes of comparison (23, pp. 538, 539).

3. A further question which must be settled in advance is that of the magnitude of the differences with which we wish to be concerned, for clearly this must in large part determine the size of the groups selected. Thus if we desire to investigate very small and subtle differences, a very large number will be required, while the detection of marked differences may be achieved by the study of a smaller number. This point will be considered further in Part II.

4. The most difficult problem of all is, of course, the development and selection of suitable methods. In other investigations, especially of juvenile delinquents, a great variety of methods have been employed: psychiatric interview (17, 26, 37); pencil-and-paper tests (18, 19, 22, 65); performance tests (18, pp. 50-54; 34, 87); psychoneurotic inventories (12 14, 68, 74); written questionnaires (22, 65, 82); verified or unverified sociological data (29, 68, 85); psychoanalysis (2, 5, 81); ethical discrimination tests (12, 39, 42, 60, 91); association tests, with or without experimental apparatus (25, 40, 44, 53); and many others. The methods used in this study will be considered in detail in Part III. It is not claimed nor believed that we have succeeded in developing methods which possess rigor and eliminate all subjective influences. In fact, so far is this from true that the investigation may well be regarded in its entirety as an exploratory or "preliminary" one.

C. PROBLEM OF PRESENT STUDY

1. *Preliminary Problem.* It was originally intended to investigate a problem closely related to probation selection and procedure, namely: What are the differences in such "sociotropic" attitudes as have been described between "good probationers" (whose selection is described in Appendix *B*) and those individuals who violate their probation? Can these differences be discovered by relatively simple psychological techniques which could serve as a guide in the selection of probationers for whom the prognosis of success would be good? However, this study presented such difficulties in the selection of cases, as we shall see, that after the investigation of two small groups, regarded as a preliminary study, it was abandoned.

2. *Final Problem.* The final problem concerned itself with an enquiry into such differences between two groups chosen on the basis of their history, all of whom were at the time of study incarcerated

and awaiting sentence. One group had several times previously been in conflict with the law, the other had committed, so far as it was possible to discover, no previous offense.[7]

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[7] The term "recidivist" in its strict legal application to adults indicates offenders who have previously been convicted of a felony. Although most of the group of repeaters in this study had felonies in their past records, a few had prior offenses of a less serious nature.

II. SELECTION OF CASES

A. SELECTIVE CRITERIA IN PRELIMINARY PROBLEM

The criteria for selection of "good probationers" and "violators" and the plan employed in the preliminary study are presented in detail in Appendix *B*. Because it was believed that unanticipated selective factors were operating, the problem in this form was abandoned. But certain differences emerged which suggested that the methods used could be applied fruitfully to cases more carefully selected. These differences are presented in brief tabular form in Appendix *B*.

B. SELECTIVE CRITERIA IN FINAL PROBLEM

1. *Criteria in Which Difference was Demanded.* For the final study two groups were selected from male applicants for probation differing in their criminal history.

a. Group A: Repeaters.

In one group it was required that the individual should have engaged in three or more prior offenses. The nature of these prior offenses was not prescribed.[8] However, arrests for "Drunk" and "Vagrancy" were excluded. Because the repetitive tendency in criminal behavior was the point of interest in this group rather than the aggravated or serious character of the prior offenses, and because also it was desired to keep both groups of comparable age, juvenile offenses were included. They were, in fact, welcomed in the belief that incorrigible tendencies beginning in early life probably had more profound psychological significance than those developing later.[9] In Appendix *C* is given in tabular form (Table 16) the distribution of "priors" of Group *A*, in which juvenile offenses are indicated. The prior offenses for each individual in Group *A* are also presented in Appendix *C*, Table 17.

The existence of such histories of prior offenses in applicants for probation may seem in contradiction to that portion of Section 1203 of the Penal Code[10] defining probationable offenses which reads:

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[8] Arrests without convictions were not included.

[9] The close association of juvenile and adult delinquency is noted in many studies (35, pp. 10, 11, 713), (55), (59, p. 8), (72, p. 347), (83, pp. 410 ff.), (89).

[10] Reproduced in Appendix *B*.

"Probation shall not be granted to any defendant unless the court shall be satisfied that he has never in any place been previously convicted of a felony." This makes it apparent that most members of Group *A* were not eligible for probation, but the right to file an application was granted by the court in order to secure more information about the defendant from the probation officer's investigation on which to base the sentence for the present offense, since most of the crimes chosen were those permitting alternative sentences determining their status as felony or as misdemeanor. The disposition of each case in Group *A* is given in Table 17 and summarized for the entire group in Table 18, Appendix *C*. In one case the sentence to Folsom was a life sentence under the terms of the *Habitual Criminal Act*.

b. Group B: First offenders.

The second group was regarded as the nearest possible approximation to a "control" group. For these individuals it was demanded that their record should be entirely free from earlier offenses and that they should be in custody at the time of investigation. It was believed that by this plan of selection the emotional effects of incarceration, powerful in adults, could be equalized to some extent in the two groups, and that the range of economic factors might be more closely similar than between a group of repeating criminals and one of adults chosen at random on the outside. If it was discovered after interview that an earlier arrest for "drunk" or "vagrancy" had occurred, even though not appearing on the official record from the Identification Bureau, such a case was discarded. Traffic violations (such as for speeding, improper parking, failure to observe a boulevard stop) alone were ignored. In the hope of guaranteeing to some extent that this group should really prove to be *single* offenders, it was required that they be regarded by the officer investigating the case as appropriate subjects for probation and also that probation should be granted by the court. It is appreciated that the status of Group *B* as "single offenders" cannot at this point be established. It can, however, be urged that in these cases this offense was regarded by the probation officer and by the court as probably the last, and that the men were held to be individuals whose attitudes as investigated by the probation officer were not of an anti-social character.[11] We find the following figures for violation of probation by examination of the records of individuals placed on probation in Los Angeles County in the years 1930, 1931, and 1932:

	1930	1931	1932
Number of cases	2036	2544	2353
Number still active (1936)	94	252	427
Per cent who violated	22.50	19.00	16.95
Per cent who violated by			
failure to make restitution	2.37	4.74	1.19
failure to report	10.50	5.20	7.35
serious offenses	9.63	9.06	8.41
Average total violations		19.48%	
Average serious violations		9.03%	

These figures are, of course, only approximate, because in each year there are still some whose probationary period has not expired and who still have time to violate their probation. It seems appropriate, when considering criminal conduct, to view separately the violations filed because of failure to pay restitution—which is often an actual impossibility—and to report, and those filed because of more seriously anti-social behavior.

In Table 19, Appendix *C,* is given the disposition of the cases in Group *B,* showing when a suspended San Quentin sentence was given and when a County Jail sentence was imposed as a term of probation.

2. *Method of Discovering Prior Criminal History.* The machinery by which the two groups were selected operated as follows: From the Director of the Court Division of the Adult Probation Department, names were secured of all male applicants for probation, of the white race and within the age limits 20 to 40 inclusive, convicted of or pleading guilty to any one of the crimes mentioned below. The period of time covered in the investigation was from June 1, 1936, through March, 1937. These names were then given to the investigator whose duty it is to visit the City and County Finger-print Identification Bureaus where the criminal record of each individual was secured. Those whose records showed three

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[11] Up to the date of writing no member of Group *B* has violated his probation.

or more prior offenses (Group *A*) and those whose records were entirely blank (Group *B*) were then interviewed.

3. *Criteria in which Similar Range was Demanded.*

a. Race. It has been mentioned that it was specified that the individuals of both groups should be of the white race. This was stipulated in the attempt to secure sufficient homogeneity to make the same methods applicable to all. Only two individuals (one in each group) were born out of the United States, and both of these had come to this country in early childhood. In Group *A* (Repeaters) 92 per cent gave their nationality as American and the group included one Hungarian born in Hungary, and one of Italian, one of Russian, and one of Serbian parentage. In Group *B* (First Offenders), 78 per cent gave their nationality as American, one was born in Holland, and two were of Armenian, one of French, one of Lithuanian, one of Polish, and one of Syrian parentage. In this group four were Jewish.[12]

TABLE I

DISTRIBUTION OF AGES IN GROUPS *A* AND *B*

(50 in each group)

Age range Years	Repeaters Number	Repeaters Per cent	First offenders Number	First offenders Per cent
38-40	4	8	5	10
36-38	2	4	2	4
34-36	3	6	0	0
32-34	6	12	3	6
30-32	1	2	5	10
28-30	4	8	2	4
26-28	8	16	4	8
24-26	4	14	7	14
22-24	4	8	14	28
20-22	11	22	8	16
Mean age	27.5		26.6	
Standard deviation	5.78		5.80	
Difference in means		0.9		
$\frac{Diff.}{\sigma_{diff.}}$		0.78		

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[12] The absence of Jews among the repeaters recalls a recent study of Hersh (38), based on statistics of sentenced persons in Poland, indicating that the incidence of criminality among Jews is about half that among non-Jews. The low rate of delinquency among Jews has been noted also by Aschaffenburg (7, pp. 52-57) and by Maller (54).

b. Age. Table 1 gives the distribution of ages for the two groups and Figures 1 and 2 present the same distributions in graphic form.

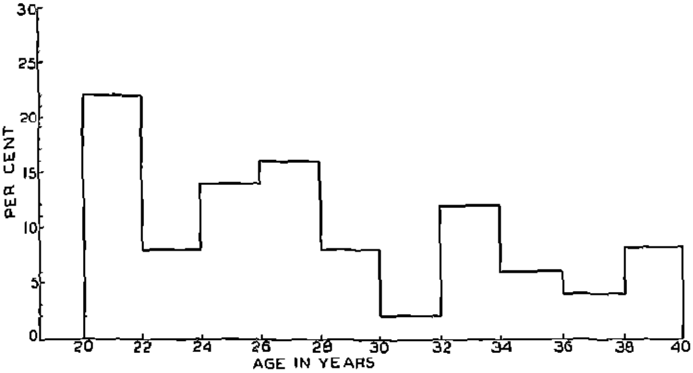

FIGURE 1
Distribution of Ages in Group A: Repeaters

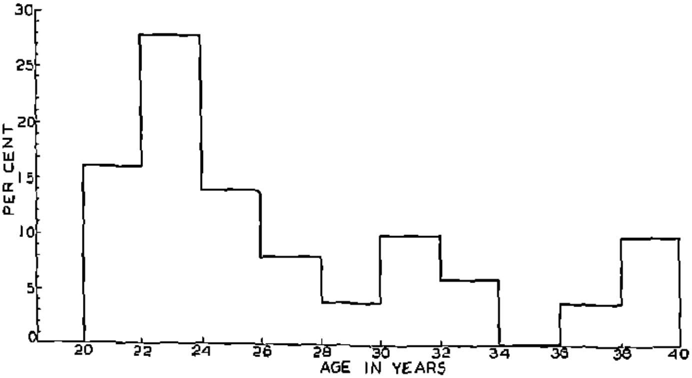

FIGURE 2
Distribution of Ages in Group B: First Offenders

It may be observed that in each decade (that is, 20-30, 30-40) the numbers are approximately equal, and that the means and sigmas of the two distributions show no significant differences.

c. Crime. Table 2 gives the percentage in each group found guilty of, or pleading guilty to, each of the crimes mentioned:

TABLE 2

CRIMES COMMITTED IN EACH GROUP

Crime	Repeaters Number	Repeaters Per cent	First offenders Number	First offenders Per cent
Burglary	12	24	15	30
Checks without sufficient funds	5	10	3	6
Forgery	9	18	11	22
Grand theft automobile*	21	42	8	16
Grand theft (money, cattle, etc.)	2	4	8	16
Petty theft with prior petty theft	1	2	0	0
Robbery or attempt robbery	0	0	4	8
Receiving stolen property	1	2	1	2
Total**	51		50	

*And/or violation of Section 503 of the Vehicle Code.
**In one case the individual was convicted of two crimes.

The larger percentage of Group *A* engaging in the theft of automobiles or pleading guilty to or found guilty of violation of Section 503 of the Vehicle Code, while not statistically significant, is striking and will be discussed in Part IV, Section A, 2.

In Group *A* (Repeaters) 39 or 78 per cent plead guilty to the offense charged, or a plea to a lesser offense (such as a plea of guilty of violation of 503 of the Vehicle Code in place of an original charge of grand theft auto) was accepted. Four of this group, or 8 per cent, were found guilty by jury trial; seven, or 14 per cent, were found guilty by court trial. In Group *B* (First Offenders), 46 or 92 per cent, entered a plea of guilty, and four, or 8 per cent were found guilty by jury trial.

d. Absence of psychopathic conditions. In the belief that the problem to be investigated was already complicated enough in so-called "normal" individuals, those giving histories of epilepsy or reporting "breakdowns" suggesting the possibility of mental disorder were discarded from both groups.

C. NUMBER OF CASES

Fifty cases were investigated in each group. It was thought that these samples were large enough to illustrate the possibilities of the methods used and to reveal any large differences in characteristics of the two groups. Since we wished in this study to look for quite marked differentiae only, we have been content to use a group so small that the statistical uncertainties involved in the interpretation of the results would necessarily obscure any relatively minor differences. In fact, the increase in the size of the groups necessary to make significant such smaller differences would have involved a prohibitively laborious investigation.

To make this point a little sharper, we may notice that with two groups of N members, differences in the percentages of the two groups conforming to some specified condition will in general be significant if they differ by more than

$$300\sqrt{\frac{1}{2N}}$$

Thus we may in this case formulate our definition of "large" differentiae as those which involve percentage differences of 25-30 per cent or more.

III. SELECTION OF METHODS AND MATERIAL

A. LIMITING CONSIDERATIONS

The range of possible methods was limited by various considerations. For one thing, the minimal education of the subjects was not known in advance, and it was believed that pencil-and-paper techniques and most standardized tests would be valueless in many of the cases. Further, the investigation was carried out in relative isolation from other psychologists, so that it was not possible to secure the collaboration of a group of observers, using such methods as rating techniques with a large number of raters. Another consideration was the fact that the only place available for the examination of the men offered little latitude. All were seen in custody, in a small room in the Los Angeles County Jail known as the "Green Room," placed at the disposal of the Probation Department for certain mornings each week. In compliance with a jail regulation that a woman must not be with a male prisoner unattended, various WPA workers at different times acted as escort. The presence of this worker, while unfortunate, presented no great obstacle, since he sat inconspicuously at one end of the room, his back both to the prisoner and to the writer, and busied himself with reading.[13] Sometimes in the early moments of an interview the prisoner looked behind him at this attendant, but discovering that he was taking no notice and that our words were not easily audible to him, he seldom paid further attention. The time for examination was also very restricted. About 10 days usually elapse between the date of filing an application for probation and the date of sentence. Of this period a large fraction had passed before the criminal records, the information crucial for selection of the cases, had been secured. It was found experimentally to be essential that *all* subjects be seen *before* sentence. In the early days of the study a few were seen after sentence had been pronounced, and it was apparent that the introduction of a penitentiary sentence, or on the other hand of a jail sentence, produced strong affective states of a contrasting character.[14] Because of the limitations in time, therefore, it was not possible to employ methods which necessitated extended or repeated application.

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[13] The most helpful of these workers described his own function thus: "I noticed at once that my duty was to act as if I were not there."

[14] Healy describes as the best possible time for enquiry after the individual has been caught "and has not already been sentenced" (35, pp. 40, 41).

B. METHODS SELECTED

The following methods were selected:

1. *Interview and Ratings Based on Interview Material.*

a. Description. For the interview an oral questionnaire was used, the early questions dealing with the prisoner's term of residence in this and other communities, with any preferences he might feel, with his work experiences, with his work plans and preferences, and with subjects touching his relationship to his personal, social, and political environment. The questions were so arranged that at the beginning of the interview there was nothing emotionally charged which would arouse resistance. Later in the interview questions were introduced involving possible criticisms of their own treatment and feelings of grievance, exploring their friendliness or hostility toward their parents, their reserve or freedom with them, the strictness or leniency of their training, and the like. Sample questionnaires, giving responses from two members of each group, are included in Appendix *D*. The responses were recorded briefly during the interview and such details as could not be written in full were filled in immediately after, while the prisoner was at work on the intelligence test. With some questions and with some individuals rather little note-taking could be done during the interview, without arousing suspicion and destroying freedom and spontaneity in the replies. In these instances a longer period was required at the end of the interview for completing the record. In all cases by prompt recording it was possible to preserve both the substance and the form of the responses.

In the attempt to translate this material into some roughly quantitative form, ratings[15] on a five-point scale based on this interview were made on the following 15 items:

1. Dissatisfaction with the community.
2. Dissatisfaction with work.
3. Social behavior: Avoidance of group activities.
4. Social behavior: Avoidance of individual contacts.
5. Political insurgency.
6. Social preferences: Desire for solitude.
7. "Chip on the shoulder."

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[15] These "ratings" may better be described as quantitative "codings" of the attitudes expressed, or a quantitative organization of the responses.

8. Antagonism toward authority.
9. Reserve with father.
10. Antagonism toward father.
11. Reserve with mother.
12. Antagonism toward mother.
13. Dissatisfaction with marital experiences.
14. Dissatisfaction with children.
15. Lack of integration with ideal.

In Appendix *E* the five descriptive points for each of these items are defined, and the questions of the interview indicated on which each judgment is based. For the four typical interviews presented in Appendix *D* the ratings based on this interview material are given. In each case the high rating indicates the anti-social end of the scale, 5 being the maximum dissatisfaction with the community, with work, etc.

With the growing psychiatric emphasis upon the understanding of the individual in his complex relationships to his environment, the individual's own statements have come to possess increasing weight. It is now believed (63, p. 96; 76, p. 279) that the criminal himself can by his comments give us more insight into his conflicts than can extensive tabulations of sociological data. As Plant says (62, p. 67), "We use the word 'findings' because of a naïve notion that what someone tells us is a 'finding,' that what a child tells us about what things mean to him is more realistic and more a 'finding' than is, for instance, the crassly artificial matter of extracting from him his foreign-born parentage." To be sure, we have no certain guarantee that the prisoner's alleged attitudes are his real ones, nor that our own interpretations of his statements where attitudes must be inferred are unerring. But where the situations investigated seem to possess little bearing on the present emergency, it is plausible to believe that actual attitudes, not overlaid with pretense, are sampled. The problem of the objectivity of the observer's judgment in interpretation will next be considered.

b. Reliability. In the effort to determine to some degree the reliability of such ratings based on interview material, the complete interviews of the 20 members of the preliminary groups were typewritten and submitted to two other raters and were also re-rated by the writer after a period of two or three months had passed since the first rating. The two other raters were a clinical psychologist and a medical student in psychiatry. Correlations between these ratings are given in Table 3.

TABLE 3
RELIABILITY OF RATINGS BASED ON INTERVIEW
Preliminary groups.

Raters	Number of ratings*	r	PE_r
Valentine and Tolman (1)	266	.81	.01
Valentine and Tolman (2)	266	.87	.01
Crutcher and Tolman (1)	271	.84	.01
Crutcher and Tolman (2)	270	.81	.01
Crutcher and Valentine	265	.83	.01
Tolman (1) and Tolman (2)	273	.89	.01

*Differences in this number are due to differences in judgment of the raters as to whether the data given were sufficient to warrant a rating.

At the conclusion of the final study the interviews of 30 members of the two experimental groups were also typed and submitted to one of these raters, Dr. Valentine, for rating. For these 30 added to the 20 of the preliminary group, the correlations both for the total group of ratings and also for each item are given in Table 4.

TABLE 4
CORRELATIONS BETWEEN TWO RATERS

Items rated	Number of ratings*	r	PE_r
All Items	658	.82	.01
1. Dissatisfaction with community	49	.87	.02
2. Dissatisfaction with work	47	.66	.06
3. Social behavior: Avoidance of groups	50	.70	.05
4. Social behavior: Avoidance of individuals	50	.88	.02
5. Political insurgency	50	.71	.05
6. Social preferences: Desire for solitude	50	.82	.03
7. "Chip on shoulder"	50	.75	.04
8. Antagonism toward authority	50	.74	.04
9. Reserve with father	47	.86	.02
10. Antagonism toward father	49	.88	.02
11. Reserve with mother	46	.75	.04
12. Antagonism toward mother	47	.77	.04
15. Lack of integration with ideal	50	.88	.02

*Differences in the number were due to two facts: (1) In a few cases the rating given by the writer had been discussed with Dr. Valentine at an earlier time. They were, therefore, discarded. (2) In a few cases no data afforded a rating on the item. The man's father or mother, for instance, may have been unknown and no parent substitute played a part in his upbringing. For Items 13 and 14 the number of cases rated was too small to permit a correlation.

2. *Intelligence Test.*

An intelligence test was given each prisoner at the end of the interview. The Otis *Self-Administering Intermediate Examination*, Form *A*, was used. Earlier experience had proved that the ease of administration of this test made it useful as an approximate measure. The 20-minute time limit was imposed and scores were transmuted into 30-minute scores by the table in the manual for that purpose. The scores are, therefore, only approximate. The large-lettered heading "Otis Self-Administering Test of Mental Ability" was cut off the test blank, the expression "Test of Mental Ability" being emotionally charged for some individuals and being easily confused among the jail population with an attempt "to find out if a man's crazy".[15a]

The reliabilities of the Otis *Intermediate Examination* between forms *A* and *B* are reported in the manual as follows:

	r	$P.E._r$
Group I, Form A first, 215 cases	.953	.006
Group II, Form B first, 212 cases	.943	.006
Average	.948	

3. *Self-Ordinary-Ideal Test.*

a. Description. In the attempt to introduce a more indirect method of investigating attitudes, a technique suggested by Knight and Franzen (24, 41), further developed by Goodwin Watson (79, p. 74), and reaching its widest elaboration and application in the work of Sweet (78) was employed, called the *Self-Ordinary-Ideal*, or the *Personal Attitudes Test.* Its purpose in this study was to detect if possible unformulated feelings of discrepancy between the man and his ideal, and of isolation or estrangement from the average man. In the form used by Sweet with boys 12 to 14, it was a pencil-and-paper technique containing 50 items, in which one descriptive point on a five-point scale was to be encircled in describing each of the three situations (1) *How I feel*, (2) *How most boys feel*, (3) *How I ought to feel*. For example, the item "Having other folks praise me" was to be rated on a five-point scale (Dislike,

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[15a] This same difficulty was met and the same technique adopted by Leahy (47, pp. 267, 268) in her study of the intelligence of parents of foster children.

Rather not, Don't care, Like some, Like a lot) for each of the three situations mentioned above. By a comparison of the attitudes indicated for the three, difference scores were secured yielding a measure of Self-Criticism (comparing 1 and 3), Criticism of the average boy (comparing 2 and 3), and Feeling of Difference (comparing 1 and 2). Other comparisons were also used by Sweet, and with a method of scoring one point for each difference, reliabilities (correlating odd and even items) are reported ranging from .76 to .94.

This method had to be extensively modified for the present study. In the first place, the use of the pencil-and-paper technique had to be avoided because of possible educational deficiencies and the difficulty of securing cooperation in such a test with these adults. Giving the test orally for each of three categories meant necessarily that the number of items must be reduced if attention and interest were not to be sacrificed. Furthermore, to explore the concept of the "Ought" or the "Ideal" required some adaptation to adult thinking. It was assumed that every man would wish for his son those values which he regarded as "ideal," and it was therefore decided to ask the prisoner what he would like for his *son*. A five-point rating scale was too elaborate for a test used in this way, so a three-point scale was employed. In the form used the test contained 28 items. Most of the first 14 were devised to sample attitudes toward ways of life which involved assuming or avoiding responsibility, winning or losing popular attention or approval, participating in or eschewing social enterprises, and the like. The second 14 had to do with recreational preferences involving solitary or social activities. The subject was asked to state in regard to each item whether he would like, dislike, or feel indifferent to it; whether he would feel a preference that his son (if he had one) should like, dislike, or be indifferent to it; whether he believed that most men liked, disliked, or felt indifferent to it. Each list was presented first for the preferences of the man himself, then for his son, then for his idea of "most men." A statement of liking was given a score of plus 1, of disliking minus 1, of indifference 0. When describing preferences for the son, the response *"I'd leave that up to him"* was scored 0. When describing the preferences of most men, the statements *"I don't know"* or *"I couldn't* *speak for most men, only for myself"* were scored 0. The items of the test are presented in Appendix *F*.

b. *Reliability*. Using the method of scoring described above, and correlating odd items against even items, the following reliabilities were determined:

	r	Corrected[*1]
a. Preliminary study (21 cases)		
Differences between Self and Ideal (Self-Criticism)	.70	.82
Differences between Self and Average (Feelings of Difference)	.61	.76
Differences between Ideal and Average (Criticism of the Average Man)	.76	.86
b. Final study (100 cases)[*2]		
Differences between Self and Ideal (Self-Criticism)	.58	.73
Differences between Self and Average (Feelings of Difference)	.62	.77
Differences between Ideal and Average (Criticism of the Average Man)	.59	.74

[*1] Using Spearman-Brown formula.

[*2] In Appendix G the means and sigmas of the odd and even scores are given.

While these reliabilities compare favorably with those of other attitude tests reported by Symonds (80, pp. 249, 260) they are much lower than those reported by Sweet. It would not be reasonable to expect that with the use of the procedure described above very high reliabilities would be achieved. For the number of items was small, and in oral presentation no carefully weighed judgments would be offered; nor was the aim of the test obvious as in Sweet's use of it where the three descriptions appeared at the same time in parallel columns. There is none of that "internal evidence of care in replying" which Sweet notes (78, p. 25).[10]

4. *Superficial Ratings.*

Two other sources of material, 4 and 5, while not much used and recognized as unsatisfactory, are included. From observation of the appearance and behavior of the prisoner in the interview situation, each subject was rated on a five-point scale on 17 traits. Such ratings are known from studies of rating scales used in the Army to have a limited usefulness and reliability except when the final rating may be the composite of ratings of many judges (69), (79, pp. 113, 114). Such a possibility was clearly precluded in the present study. The purpose of these estimates was primarily to determine in some roughly quantitative way whether one group was more cooperative and responsive in the interview situation than the other. Four of the items rated (friendliness, interest, frankness, freedom from suspicion) were really attempts to describe the rapport established with the individual.

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[10] Only one prisoner out of the number tested voiced any "insight" into the purpose of the questioning.

For a period of several months the same W.P.A. worker acted as escort to the jail. After manifesting interest in the prisoners interviewed and in their attitudes, he was asked to rate them on these characteristics. Since his opportunity of observing the man was limited to furtive glances at his back, and since he could at no time during the interview see his facial expressions, no great weight is attached to these ratings, and furthermore the item "freedom from tension" was discarded in determining their correlation with the writer's.

One thousand fourteen ratings for 64 individuals (32 in each group of repeaters and first offenders) gave a correlation between the two raters of .45 (±.03). This is a correlation of the same order often obtained between teachers' ratings of their children on characteristic attitudes and habits (78, p. 11), (79, pp. 94, 95). The 17 superficial items and the five-point scale used in each are shown in Appendix *H*. In these items the high rating indicates the maximum *favorable* description.

5. *Biographical and Sociological Data.*

These data are derived from two sources: (*a*) from answers given to certain factual questions in the interview, and (*b*) from the work sheets of the probation officers' investigations. Their reliability is open to question because they are in most instances unverified.[17] The form used for recording the data taken from the officers' work sheets is given in Appendix *I*. The other items may be recognized as derived from the interviews in Appendix *D*.

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[17] The Gluecks (27, pp. 85-95) have pointed out the fallibility of unverified sociological data, and in their own careful studies have emphasized the importance of verification. To carry out the procedure of verification requires a large staff, great expenditure of time and money, and sometimes extensive travel, all of which were not possible in the present study. It

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is regrettable that the character of this material makes it not altogether trustworthy, but it was believed that even with the knowledge of these limitations and defects, some of the alleged facts would be of interest.

IV. RESULTS AND DISCUSSION

A. Ratings Based on Interview

In Table 5 are given the mean ratings[18] for both groups on the 15 items described in Part III. Standard deviations, differences in means, and critical ratios for the differences are also shown for each item.

TABLE 5
Ratings Based on Interview*

Item	Repeaters N.	Repeaters M	Repeaters σ	First offenders N.	First offenders M	First offenders σ	Diff. means	$\frac{\text{Diff.}}{\sigma \text{ diff}}$
1 Dissatisfaction with community	50	2.08	1.31	50	1.41	1.19	.67	2.68
2 Dissatisfaction with work	50	1.97	1.10	50	1.59	1.16	.38	1.65
3 Social behavior: Avoiding groups	50	3.24	0.83	50	2.85	1.09	.39	2.00
4 Social behavior: Avoiding individuals	50	1.98	1.42	50	1.54	1.15	.44	1.69
5 Political insurgency	50	2.77	1.00	50	2.16	0.89	.61	3.25
6 Desire for solitude	50	1.55	1.17	50	1.40	1.04	.15	0.68
7 "Chip on the shoulder"	50	2.71	1.18	50	1.38	0.70	1.33	6.75
8 Antagonism toward authority	50	2.39	1.19	50	1.23	0.64	1.16	6.10
9 Reserve with father	47	3.87	1.37	42	2.68	1.26	1.19	4.26
10 Antagonism toward father	48	2.91	1.44	44	1.83	1.40	1.08	3.64
11 Reserve with mother	49	3.50	1.42	48	2.46	1.40	1.04	3.64
12 Antagonism toward mother	49	2.01	1.07	49	1.56	1.07	.45	2.08
13 Dissatisfaction with marriage	20	2.60	1.45	20	1.78	1.60	.82	1.70
14 Antagonism toward children	10	1.70	0.81	12	1.17	1.00	.53	1.38
15 Lack of integration with ideal	50	2.84	1.15	50	1.52	1.07	1.32	5.99

*The rating 5 always represents the maximum degree of the attitude listed.

The same data are presented graphically in Figures 3 and 4, Figure 3 indicating the means and standard deviations of the

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[18] It will be recalled from III, B, that the reliability of these ratings was established on the preliminary group and 30 members of the experimental group with the cooperation of two other judges. Reliability coefficients ranging from .81 to .89 were determined. On the separate items reliability coefficients ranged from .66 to .88. The ratings here presented are those of the writer, since these alone were available in all cases.

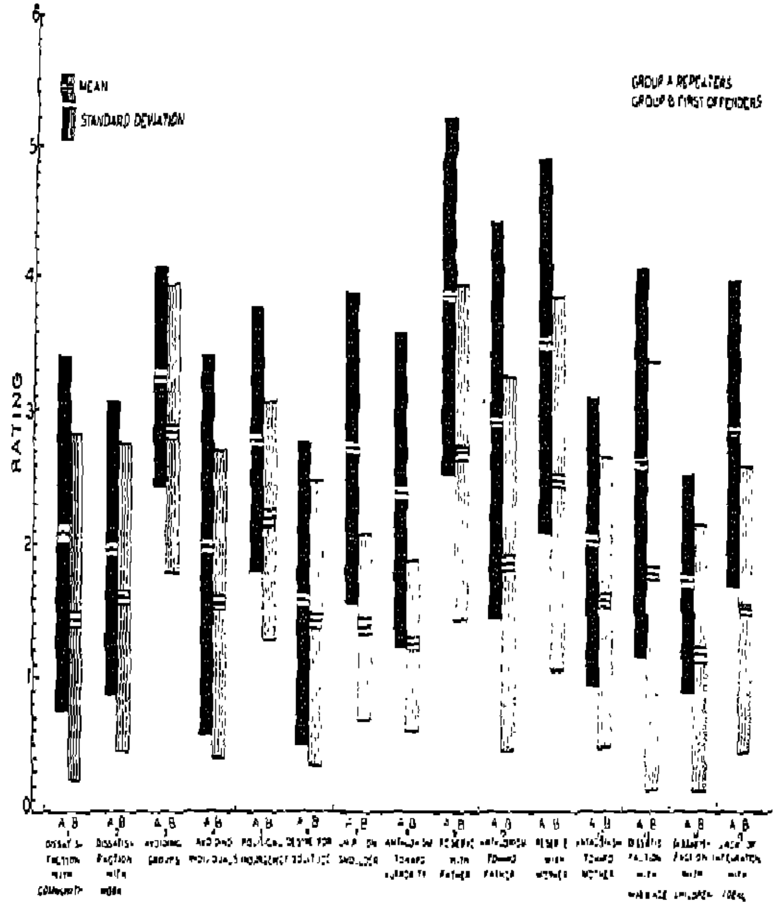

FIGURE 5

MEANS AND STANDARD DEVIATIONS OF GROUPS A AND B ON EACH ITEM RATED

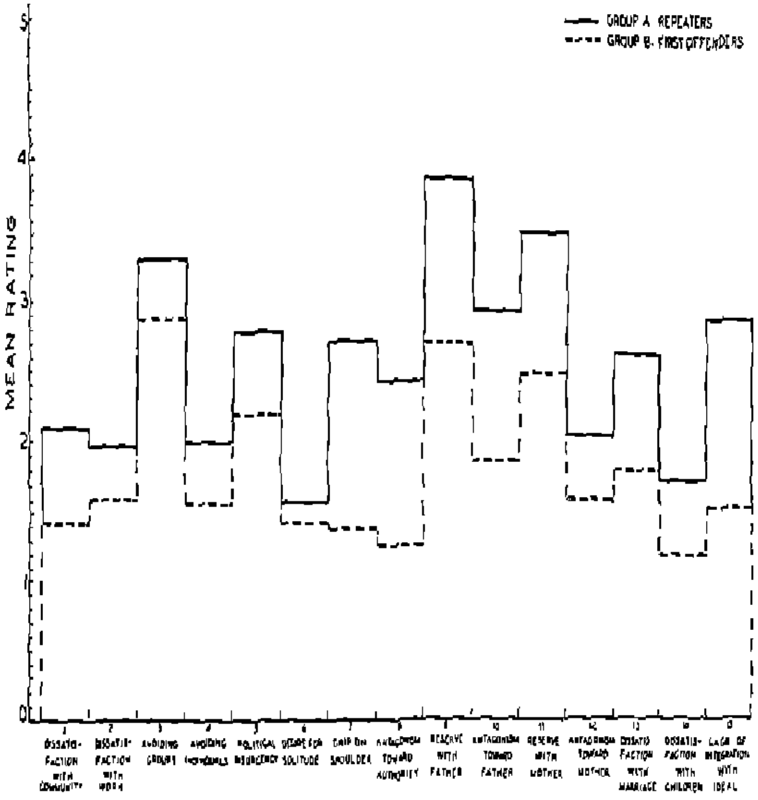

FIGURE 4

Mean Ratings of Groups A and B on 15 Items

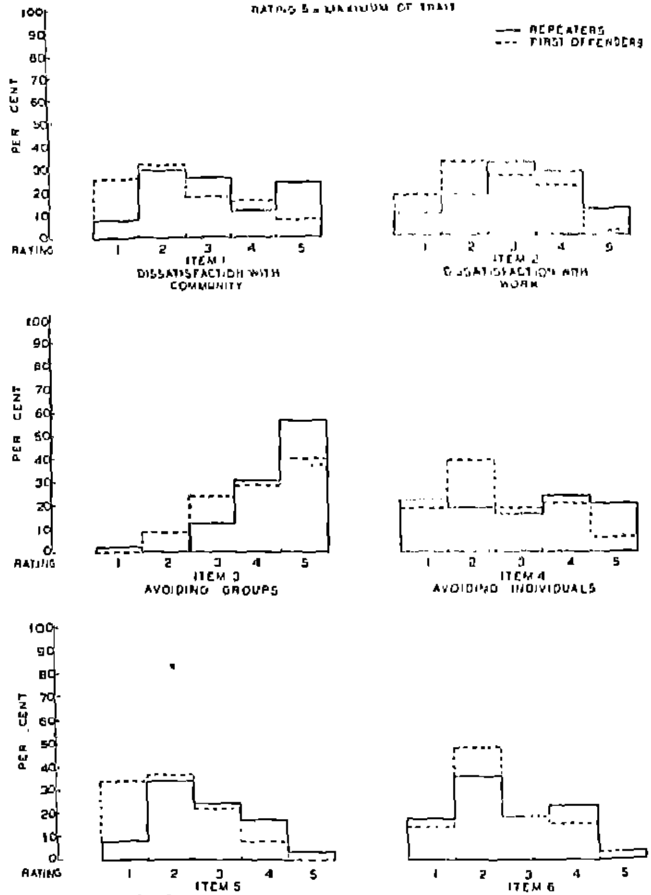

FIGURE 4a

Distribution of Ratings on 15 Items Based on Interview

two groups plotted adjacently for each item, Figure 4 giving the superimposed means of the two groups.[10] In Figures 4a, 4b, and

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[10] In Figures 4, 5, 6, and 7 we have disregarded the convention that values for a succession of disparate items are more appropriately represented by a bar diagram than by a connected line. This has been done in the interests of obtaining simpler and more readily appreciated figures

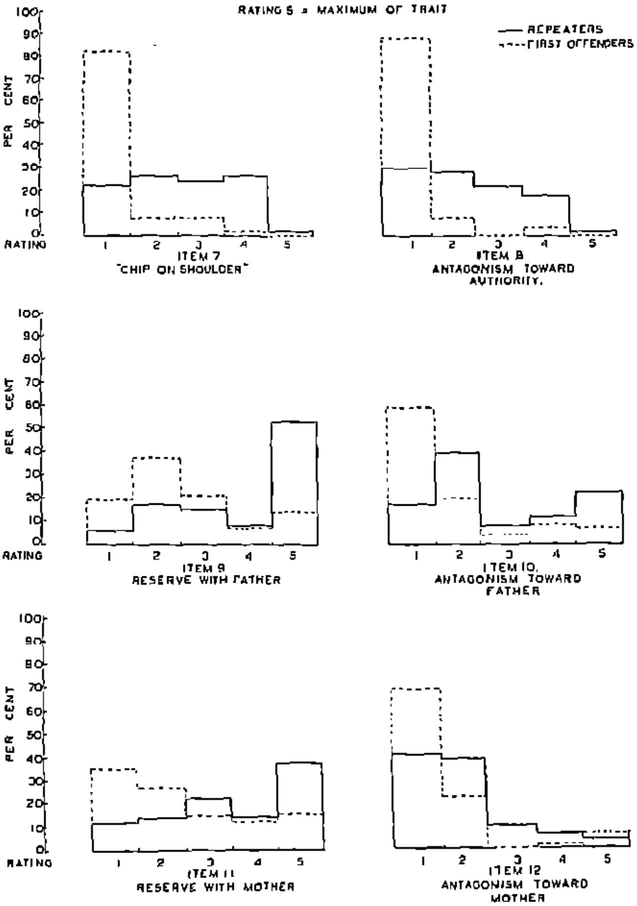

FIGURE 4b

DISTRIBUTION OF RATINGS ON 15 ITEMS BASED ON INTERVIEW

4c the distributions of the two groups on each item are represented.

1. *General Observations.*

From the table and figures it can be observed that all of the

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than is possible in the case of two sets of data when the convention is followed. No continuity for the items plotted along the horizontal axis is implied.

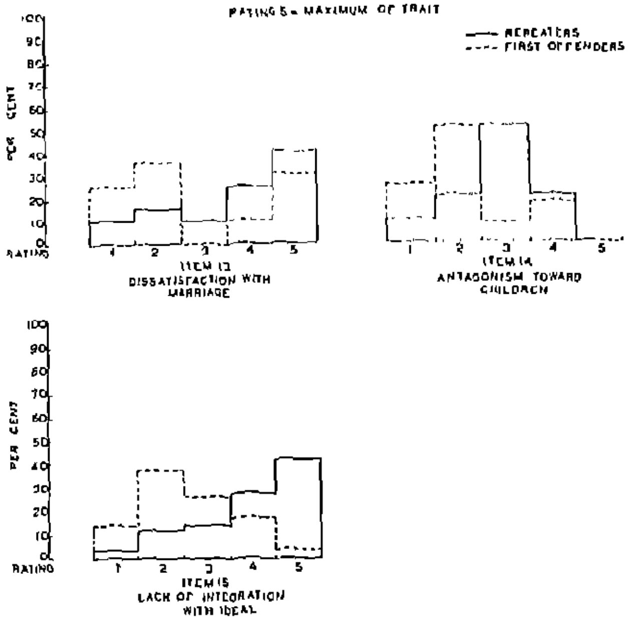

FIGURE 4e

Distribution of Ratings on 15 Items Based on Interview

differences are in the expected direction; that is, on each item the group of repeating criminals expresses more hostility or dissatisfaction than the first offenders. Indeed, this trend is so consistent that it can hardly be ascribed to accident, and must be taken to indicate a real difference between the two groups. Thus if we could suppose that all the items investigated were independent of each other, the chance that, without any differences between the populations sampled, all of the means of one group would lie higher than those of the other would clearly be 2^{-15}. In this problem, it is true, some correlation between the items may be expected, so that this estimate cannot be regarded as quantitatively valid. However, the battery has been chosen to correspond to different aspects of anti-social feeling, to some extent independent of each other. Since from an a priori point of view these aspects might not be regarded as necessarily correlated, we may safely conclude that the differences found are not accidental.

From a comparison of the standard deviations of the two groups it can be further observed that there is much overlapping in the distributions. In fact, even where the differences in means are statistically significant,[20] in only two items (7 and 15) is that difference itself greater than the standard deviation of either group on that item. From this it follows that, at least for the characteristics here investigated, there can be no question of a sharp division of the two groups into types, nor any justification whatever for trusting the rating of a given individual on any one of these items as a valid criterion for deciding to which group he belongs.

Although some of these differences found are very marked, it cannot be urged that in this study a causal relationship has been in any sense established in the association of these characteristics with the more habitual criminal behavior. For in the adult criminal it is impossible to differentiate between those attitudes acquired in the course of, and even because of, his criminal career, and those with which he may have embarked upon that career. The mechanism of projection of responsibility and guilt must always be borne in mind in the interpretation of such attitudes as these investigated. But even if one should wish to take a cautious stand upon the ground that *all* of these attitudes are projections, it is yet of interest to enquire *in what directions* such projections tend to occur.

2. *Consideration of Specific Items and Some Interrelations.*

The presence of slightly greater mobility and of poorer work habits in most groups of aggravated offenders (27, pp. 129, 130, 193, 194, 273, 274), (66), (68), (84), (85) led us to expect in this group of repeating criminals a greater degree of dissatisfaction with the community in which they live and with their work. These two items (Items 1 and 2), however, showed differences between the two groups whose critical ratios were less than 3, although in the first item the magnitude of the ratio indicates that there are 996 chances in 1000 that the difference is greater than zero. The disposition to affiliate with clubs or unions or other organizations (Item 3) showed again a difference whose critical ratio was 2. As to the avoidance of individuals, both in practice and in taste (Items 4 and 6), these too showed no statistically significant differences. The direction of the small differences found is somewhat at variance with the results of Stevens (76, pp. 298, 299) and of Healy and Bronner (37, p. 52) investigating similar solitary or gregarious tendencies, though in these studies the groups were differently chosen. Stevens used 13 questions as the basis of a questionnaire filled out in writing by 100 college freshmen (average age 18) and 100 inmates of Ohio State Penitentiary, all of whom with the exception of one had served previous sentences. The average number of previous commitments of the recidivists was two, and the crimes include the whole criminal calendar. Question 11 read: *"As a child were you solitary? That is, did you play alone a lot? Or were you an active companionable child?"* He found the incidence of "solitary" reactions higher in the student group, 27 per cent of the students, 6 per cent of the recidivists thus describing themselves. As "an active companionable child", 64 per cent of the students, 85 per cent of the recidivists so picture themselves. Ackerly (1, p. 150) in a preliminary report on Healy and Bronner's recent study finds that the delinquent group of adolescents in their investigation showed greater extroversion than the control group of siblings. To be sure, both of these findings apply to childhood or adolescent reactions, rather than to adult behavior, and are not strictly comparable to these two items of the present study.

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[20] By "statistically significant" we shall mean throughout this discussion those differences in which $\frac{\text{Diff.}}{\sigma\ \text{diff.}} = 3$. Expressed in terms of probability, it may be stated in regard to differences of such magnitude that there are 999 chances out of 1000 that the difference is greater than zero.

On Item 5, *Political Insurgency,* the repeaters show significantly higher ratings. This rating was based upon opinions of the present political and economic regime. It is not to be inferred from this that either group expressed much tendency toward radicalism, as the means on the "approving" or non-radical side of the midpoint indicate. Indeed, lively political or economic interest was infrequently encountered in either group, but the fact that 68 per cent of the first offenders were alleged voters while only 34 per cent of the repeaters so claimed (as we shall see in Section E), suggests that at any rate this interest was more active in the former group.

On Item 7, *"Chip on the shoulder",* the repeaters show strikingly higher ratings. Feelings of grievance, of having had an "unfair deal" at home, at school, at the hands of the courts,—this theme recurs throughout their stories. To be sure, the actual character of their past treatment, the objective correlate of this feeling, could *not at this point* be ascertained, nor could it be claimed that these mild ideas of persecution antedated their delinquency. The same considerations apply to Item 8, *Antagonism toward authority*, which also shows a significant difference between the two groups. It was believed possible on psychoanalytic grounds that both of these items might derive from the attitude toward the father, sampled in Item 10, and correlations were computed for the two groups together:

Between	*N*	*r*	$P.E._r$
Items 7 (Chip on shoulder) and 10 (Antagonism toward father)	92	.69	.04
Items 8 (Antagonism toward authority) and 10 (Antagonism toward father)	92	.65	.04

From these correlations the inference seems indeed reasonable that these two anti-social attitudes, feelings of grievance, or a "grudge-like attitude" as Healy terms it (35, p. 355) and antagonism toward authority in general, are associated to a high degree with hostility toward the father.

On three of the items sampling attitudes toward the parents (Items 9, 10, 11) significant differences were found between the two groups. These attitudes to some degree may well be the residue of ones present in childhood, the attempt being made in the interview to explore their early relations with the parents. Questions concerning parental strictness, nagging, habits of punishment, amount of interest and supervision, spoiling, affection, their own fears and approval and confidences,—all of these applied rather to the past than to the present, and it is reasonable to accept their account as describing their present conception of childhood situations. However, it must again be noted that criminal careers have supervened upon these childhoods in one of the groups and the tendency to project blame and responsibility may easily cause the parents to be selected for this onus. The greater degree of hostility toward the father in the repeating group is evidence for the point (emphasized by Levy 49, pp. 200 ff.) that we find in this group *not* individuals whose criminal act is a neurotic symptom, for then the hostility toward the father would be repressed; but we find rather those whose criminal behavior is an expression of aggressive personality drives and where the delinquent career may represent an active rebellion against the father generalized into other social relationships.[21]

With the possibility of the mechanism of projection in mind, it seemed possible that those individuals who gave drunkenness as the cause of their present offense or those who repudiated their responsibility by the plea of "*Not Guilty*" might have less need to project upon society or upon the father blame for their careers. In that case we might reasonably expect in these men a lower average rating on Item 8, *Antagonism toward authority*, and on Item 10, *Antagonism toward the father*. Since there were 18 in the group of repeaters who blamed intoxication for their criminal act and three who plead "*Not Guilty*", this group of 21 was compared in regard to these two items with the remaining 29 who claimed no such exemption from responsibility. The results were as shown in Table 5a.

TABLE 5a

	N	Mean	σ	Diff. means	$\frac{\text{Diff.}}{\sigma \text{ diff.}}$
		Item 8			
Drunk or "Not Guilty"	21	2	1.07	.57	1.76
Others	29	2.57	1.20		
		Item 10			
Drunk or "Not Guilty"	21	2.43	1.28	.85	2.15
Others	27	3.28	1.46		

The differences were indeed in the expected direction, that is, in each case the drunk or not-guilty group expressed less antagonism toward authority and toward the father; but neither was large enough to be statistically significant.

At this point the preponderance of car thefts in the group of repeaters (42 per cent in this group, 16 per cent in the group of first offenders) must be considered. This fact was not noted while the cases were being collected, and became apparent only when the results were assembled. This group was compared with the total group of applicants for probation in 1936 charged with the crimes which we have selected in this study (1410 individuals). Of the larger group 25 per cent were charged with car theft as against 42 per cent in this group of repeaters. Several facts about this group are striking, and it is believed that the problem of the car-stealing offender is one in need of further investigation and research. All but three of these, that is, approximately 86 per cent, are under 30 years of age. In all cases but five, that is, in 76 per cent, theft of a car, or the juvenile equivalent, theft of a bicycle, appears among their prior offenses. This suggests the possibility of a compulsive mechanism operating in the younger male criminals of this group, perhaps associated with a psychological need to assert and establish their masculinity. This impression has been further strengthened by material from other cases examined, though not belonging to either of the groups in this investigation. It seemed relevant to enquire into the attitudes expressed by this group toward society (Item 8) and toward the father (Item 10). This comparison is given in Table 5b.

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[21] Goodwin Watson (90) finds that such combative attitudes, developed originally toward parents and extended into other relationships, as well as feelings of grievance, are characteristic of a group of graduate students given strict home training.

TABLE 5b

	N	Mean	σ	Diff. means	$\frac{\text{Diff.}}{\sigma \text{ diff.}}$
		Item 8			
Car stealers	21	2.55	1.23	.27	1.62
Non car stealers	29	2.28	1.13		
		Item 10			
Car stealers	20	3.18	1.35	.47	2.34
Non car stealers	28	2.71	1.49		

Here the differences are in the direction of greater rancor toward society and toward the father on the part of the car stealers, but again they are not large enough to be statistically significant.

It is of interest that while significantly greater reserve, isolation and lack of any confidential quality prevail in the relationships described with both parents in the group of repeaters (the correlation between the reserve with father and that with mother is .53 for all members of both groups), there is no significant difference between the two groups in their antagonism toward the mother. This is a suggestive finding and led us to investigate the correlation between the antagonism toward the father and that toward the mother in both groups considered together and in each group separately. These correlations are given in Table 5c.

TABLE 5c

Antagonism toward father versus Antagonism toward mother	N	r	$P.E._r$
Whole group	87	.32	.07
Repeaters	47	.33	.09
First offenders	44	.17	.10

Here the misfortune of small numbers is apparent, for the probable errors of these coefficients of correlation are so large that they must be regarded as approximately equal. Nevertheless they are all very low positive correlations, where on psychoanalytic grounds a negative correlation might have been predicted in the light of the fact that friction between the parents was reported frequently, especially in the group of repeaters.

Only a small proportion of each group (40 per cent) had married, and even a much smaller proportion had children. But in the attitudes toward their marriage, their wives, and their children no significant differences emerged between the two groups. Striking, however, is the difference between them in the degree to which their lives have failed to conform to their ideals, in work and education and training (Item 15).

The findings in regard to the attitudes toward the parents in these groups are consistent with those reported by Stevens who finds 15 per cent more of his recidivist group expressing fear of the father who as the strict disciplinarian in the family had come to stand as the "avenger" to the boy. Regarding the father "as a pal" were 27 per cent more of the student group; "patterning after the father" were 64 per cent of the students, 27 per cent of the recidivists. Comradeship with and confidence in the father unquestionably favor identification, and make aggressions directed toward him unnecessary.[22]

The findings in the present study may also be said to agree in substance though on a more superficial level with those of Healy and Bronner in their most recent investigation (37, pp. 122 ff.). They find 91 per cent of their 105 delinquents, and only 13 per cent of their sibling controls, giving evidence of extreme disturbance because of emotion-provoking relationships with others, mainly with others in the family. In 46 cases were found feelings of being rejected, deprived, insecure, not understood, in affectional relationships; in 46 cases, strong feelings of either real or fancied inadequacy in the home, school, or social life; in 34 cases, intense feelings of discomfort about family disharmonies, conditions of family life, etc. In the case histories presented are many illustrations of attempts to bolster up the ego by hostile, aggressive, and anti-social behavior in the face of experienced rejection or deprivation in the family life. Dr. Ackerly, one of the workers in their research (1, p. 150) notes in the group of "father rebels" an average *IQ* four points lower than in the control group of non-rebellious siblings. Considering those 13 repeaters whose rating for father-antagonism was either 5 or 4.5, the average *IQ* for this small group is 101.4 as against 96.3 for the whole group. Although this difference is in the opposite direction from that found by Healy and Bronner, it is not statistically significant. Some of the responses offering partial basis for the rating on the attitude toward the father are so sharply distinctive as to be of interest. A few of these are reproduced here:

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[22] Stevens includes questions concerning the ages at which changes in attitude toward the father had occurred, and at which such habits as bedwetting, thumbsucking, and nail-biting had been discontinued. This would seem to put an undue strain upon memory precision, hardly warranted in the light of inaccuracies revealed in such historical data. But he interprets the results as lending support to the Freudian concept of three childhood periods characterized by specific "libidinal" and behavior differences.

a. Individual 48. Group I. Repeater. Age, 20. *IQ,* 103.

> "To tell you the truth, I didn't like anything about my father. (Stepfather in this case.) He had a quick temper and was mean. When a fellow takes a belt of leather and soaks it and beats his children, he's not much of a father in a good sense. He was the first father I ever knew, and that's what he was like."

b. Individual 43. Group I. Repeater. Age, 24. *IQ,* 104.

> "I liked my father's build. That was about the only thing I liked. Everything else I disliked. You could hear his voice blocks away. I ran away from home so many times they knew my whole record at Juvenile without askin' me any questions. A fellow in San Quentin said to me once when I was tellin' him about my father, 'Maybe he used narcotics'. But I don't think so. I think it was just his temperament."

c. *Individual 33.* Group II. First Offender. Age, 37. *IQ*, 77.

> "He'd take me with him wherever he went. When the Church lodge threw a picnic or dance, he'd take me. When he'd go hunting or fishing, I'd go with him. We were like two companions. I'd always be with him, chopping wood, repairing the house, all the time."

d. *Individual 27.* Group II. First Offender. Age, 23. *IQ*, 115.

> "The things I like about my father, why he's honest, companionable, kind, generous. I can't think of anything about him I dislike."

Healy and Bronner's "father rebels" are characterized as more "colorful" than the non-rebellious and non-delinquent controls (1, p. 151). It will be seen from the flavor of the above excerpts that the same comparison could well be made between the two groups of the present study.

B. INTELLIGENCE

Results of the Otis Self-Administering Intermediate examination showed no significant differences between the means of the two groups:

TABLE 6
COMPARISON OF OTIS *IQ*s

	Mean *IQ*	σ	Diff. means	$\frac{\text{Diff.}}{\sigma \text{ diff.}}$
Repeaters	96.3	16.7	3.3	1.006
First Offenders	99.6	16.05		

TABLE 7
DISTRIBUTION OF OTIS *IQ*s

IQ Range	No. cases Repeaters	No. cases First offenders
110 and above	11	20
100—110	17	12
90—100	9	5
80— 90	4	4
70— 80	5	7
60— 70	2	2
Below 60	2	0
	50	50

Table 7 gives the distributions of *IQ*s for the two groups. It will be seen that a larger number of the first offenders have *IQ*s of 110 or above, though the means show no significant differences. These results agree with many of those reported in earlier studies already referred to.

C. SELF-ORDINARY-IDEAL TEST

Table 8 shows the means, standard deviations, differences in means, and critical ratios of these differences for the two groups in the three sets of differences investigated by the Self-Ordinary-Ideal Test.

TABLE 8

DIFFERENCE SCORES IN SELF-ORDINARY-IDEAL TEST

	Repeaters			First offenders				
	N.	Mean	σ	N.	Mean	σ	Diff. means	$\frac{\text{Diff.}}{\sigma\,\text{diff.}}$
1. Self-Ideal (Son) Difference scores	50	11.98	5.06	50	10.02	6.41	1.96	1.70
2. Self-Average Difference scores	50	21.38	7.52	50	18.34	7.69	1.52	2.00
3. Ideal (Son) Average Difference scores	50	20.30	7.19	50	18.14	7.93	2.16	1.43

It may be observed that none of these differences is statistically significant, although here again all are in the "expected" direction; that is, the repeated offender, when these indirect and unformulated differences are investigated, tends to feel himself less close to his ideal (his son) and farther removed also from the average man. Furthermore, he tends to put a greater distance between the average man and his conception of the ideal.

Lest there should seem to be a contradiction between the failure to find a significant difference between the two groups in this investigation of Self-Ideal difference scores and the finding of a marked difference on Item 15 in the battery of ratings (Lack of Integration with the Ideal), it must be noted that in the Self-Ordinary-Ideal test comparisons were made *not* between what *had actually happened* to the man in the course of his experience and *what he would choose for his son, as in the interview,* but rather between what he himself *likes* or *prefers* and what he would wish his son to like or prefer. It is apparent that these comparisons are very different in character. Just in this connection it seemed of interest to enquire: Did the two groups express marked differences in their own tastes on any of the items, did they differ significantly in the preferences named for their son, or in the tastes which they ascribed to the "average" man? It was found that on one item, "Have people let you alone", such a difference occurred in the expression of their own preferences (Table 8a).

TABLE 8a

Item	Per cent liking: Repeaters	Per cent liking: First offenders	Difference in per cent	Diff. / σ diff.*
8. Have people let you alone	68	34	34	3.62

*σ diff. computed by the formula $\sqrt{\frac{p_1q_1}{N_1} + \frac{p_2q_2}{N_2}}$

More of the repeaters tended to interpret this item as meaning "not bother you," "not interfere with you," and this seemed to them a desideratum; while the others often thought of it as implying neglect or rejection by others, and this seemed to them undesirable. This ambiguity or flexibility in interpretation was preserved intentionally in this item in the belief that the aspect which dominated the view of an individual itself had significance.

There were no differences on any of the items in the per cents in the two groups wishing their sons to have certain tastes, none of the critical ratios of the differences appearing here being as high as 2. There was, however, one significant difference in the per cents of the two groups ascribing dislikes to the "average man." Here again it was the same item which differentiated them (Table 8b). In other words, significantly more of the first offenders, just as they were themselves more social in their tastes, conceived of the average man also in this way.

TABLE 8b

Item	Per cent describing average as disliking: Repeaters	Per cent describing average as disliking: First offenders	Difference in per cent	Diff. / σ diff.
8. Have people let you alone	24	56	32	3.46

On two other items the differences in per cents liking or disliking those items, while not statistically significant, showed critical ratios over 2 and are of passing interest. More of the repeaters *expressed an actual dislike of the idea of being* "one of the richest men in the United States." A frequent comment was: "That would be too much trouble." Probably in the wish to avoid responsibility, there is also a greater number of repeaters wanting "to lead a roving life" (Table 8c).

TABLE 8c

	Per cent disliking		Per cent liking		Difference	
	Repeaters	First offenders	Repeaters	First offenders	in per cent	$\frac{\text{Diff.}}{\sigma \text{ diff.}}$
1. Be one of the richest men in the U. S.	88	70			18	2.27
2. Lead a roving life			46	22	24	2.62

On one item describing the tastes of the average man there was also such a difference (Table 8d). Since only 24 per cent of each group themselves expressed a liking for this type of fame, it seems probable that this description of the average man was intended as an aspersion.

TABLE 8d

	Per cent describing average man as liking		*Difference*	
Item	Repeaters	First offenders	in per cent	$\frac{\text{Diff.}}{\sigma \text{ diff.}}$
4. Be a popular hero	80	56	24	2.66

The failure to find significant differences between our two groups in difference scores yielded by this test may be interpreted, of course, as indicating that no differences of this kind exist. Such an interpretation can be defended on the ground that there is indeed no evidence of any kind for a sharply defined "type" in the group of repeating offenders when compared with a control group, and *many other items similarly show no significant differences* between the two. It may be argued in this connection that it is not in the sphere of feelings of distance from their ideal nor yet from their fellows that one can search fruitfully for differentiae between two such groups. Or, one may contend, even if such feelings exist, it is not reasonable to expect to tap them by such superficial and indirect methods. The fact, however, that so similar a method was used by Sweet successfully (78) in differentiating between delinquent and non-delinquent groups of adolescent boys, suggests that more carefully selected items, a longer list of items, pencil-and-paper administration permitting more care in the responses, and the achievement of higher reliabilities in the scales might have yielded other results, and that further work along these lines might well prove fruitful.

D. Superficial Ratings

Table 9 gives the mean ratings, standard deviations, differences in means, and critical ratios of these differences for each of the 17 items included in the list of superficial ratings, and Figure 5 shows the superimposed means of the two groups.

TABLE 9
Superficial Ratings

	Repeaters N. 50		First offenders N. 50		Diff.	Diff.
Item	Mean	σ	Mean	σ	means	σ diff.
1. Masculinity	3.17	0.74	2.95	0.69	.22	1.53
2. Physique	3.24	0.86	3.07	0.87	.17	0.98
3. Speech: clarity	2.87	1.01	3.24	0.97	.37	1.85
4. Speech: articulateness	3.49	1.19	3.66	1.08	.17	0.75
5. Neatness	2.70	0.66	3.10	0.94	.40	2.47
6. Courtesy	3.14	0.57	3.43	0.63	.29	2.36
7. Alertness	3.38	1.02	3.62	1.04	.24	1.16
8. Interest in interview	3.20	1.02	3.69	0.96	.49	2.46
9. Frankness	3.36	1.00	3.88	0.96	.52	2.65
10. Friendliness	3.20	0.78	3.59	0.76	.39	2.44
11. Freedom from suspicion	2.98	0.92	3.50	0.95	.52	2.89
12. Freedom from tension	1.57	1.07	1.91	1.09	.34	1.62
13. Freedom from restlessness	1.94	0.88	1.99	0.79	.05	0.30
14. Poise	3.52	0.94	3.72	0.92	.20	1.11
15. Ease of social contacts	3.11	1.04	3.49	1.02	.38	1.85
16. Cheerfulness	2.80	0.83	3.30	0.82	.50	3.03
17. Emotional expressiveness	2.68	0.95	3.04	0.92	.36	1.98

Only one of the items, "cheerfulness," shows a significant difference between the two groups; and indeed the greater gravity of

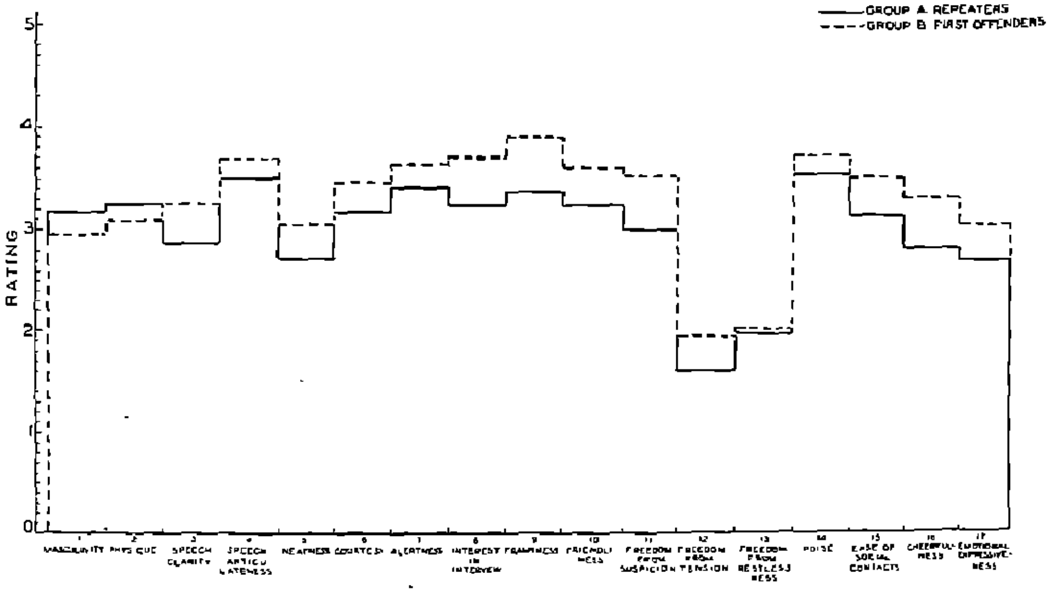

FIGURE 5

Mean Ratings of Groups A and B on Superficial Characteristics their plight at the time of interview could well account for considerable sombreness on the part of the repeaters. On the four items intended to describe the attitude toward the interview situation, that is, in the degree of interest in the interview, frankness, friendliness, and trustfulness, the first offenders received higher ratings, with the critical ratios for the differences more than 2 but less than 3.

It is not desired to belabor these very trivial comparisons. It is sufficient to note that on most of these superficial items no marked differences emerge.

E. Biographical and Sociological Data

Table 10 gives a comparison of the two groups on a number of items of sociological import, where by inspection of the critical ratios in the last column it may be seen which of these show significant differences of percentages in the two groups.

Figures 6 and 7 present this same material in graphic form, Figure 6 showing those conditions in which a higher incidence occurs among the repeaters, Figure 7 showing the opposite situation, to facilitate comparisons.

Most of the information on these points came from replies to questions included in the interview; the rest (specifically, 1, *5b*, *6a*, *d*, *e*, and 9) were taken from the probation officer's work sheets. A consistency in the direction of the differences may be noted. The items, however, on which these differences are statistically significant are: (*a*) presence of parental friction, (*b*) having other income besides earnings, property, auto or insurance, (*c*) voters. All of these show critical ratios of 3 or more. The first two have been found consistently by other investigators using much larger numbers to characterize delinquent groups. Although the difference in the matter of voting may be interpreted in part as signifying more lively social participation and interest on the part of the first offenders, it must also be remembered that many of the repeaters had been cut off by their prison sentences from the opportunity for such participation. The difference between the groups in the per cent reporting extremes of strictness or leniency in their upbringing approaches a value regarded as statistically reliable.

Quantitative data made possible also a comparison of the following items (Table 11).

TABLE 10

COMPARISON OF SOCIAL AND ENVIRONMENTAL CONDITIONS

	Per cent incidence		Difference in	Diff.
	Repeaters	Offenders	per cent	σ diff.[*2]
1. Home conditions				
Poor home conditions noted	46	26	20	+2.13
2. Family relationships				
a. Parental friction	52	24	28	+3.01
b. Separation of parents	42	26	16	+1.71
c. Separation of parents before seven	26	12	14	+1.81
d. Death of one parent	36	30	6	+0.64
e. Death of parent before seven	12	16	4	—0.58
f. Presence of step-parent	30	16	14	+1.69
3. Methods of upbringing				
a. Excessive strictness	32	16	16	+1.91
b. Excessive leniency	18	8	10	+1.50
c. Either extreme	50	24	26	+2.80
4. Position in family				
a. First born	42	24	18	+1.95
b. Youngest	16	18	2	—0.27
c. Only child	14	16	2	—0.28
5. Relations to other individuals				
a. Claiming no friends	20	8	12	+1.75
b. Having co-defendants	32	30	2	+0.22
6. Work experiences and economic situation				
a. Military or naval record	34	22	12	+1.35
b. Experience of job diversity[*1]	56	42	14	+1.41
c. Job at time of offense	28	48	20	—2.10
d. Having other income, property, auto, insurance	24	58	34	—3.68
e. Having dependents	22	32	10	—1.13
7. Social participation: votes	34	68	34	—3.62
8. Religious interest: prays	44	50	6	—0.60
9. Venereal disease	28	24	4	+0.46
10. Drunk at time of offense	36	18	18	+2.07
11. Residence in Los Angeles				
a. Ten years or more	44	26	18	+1.92
b. One month or less	20	8	12	+1.75

[*1] Four or more different kinds of work reported.

[*2] A plus indicates those differences in which the repeaters show the higher incidence.

Here no critical ratios are as large as 3, though average monthly earnings and educational attainments show differences whose critical ratios are more than 2.

Such items as all of the above have been widely considered in their

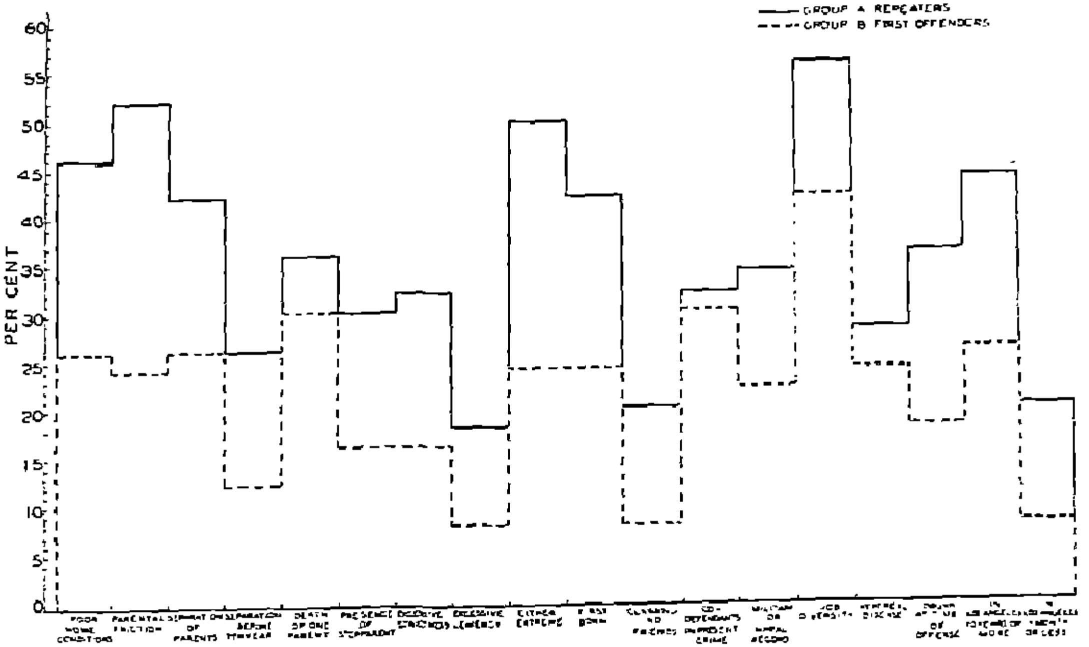

FIGURE 6

COMPARISON OF SOCIAL AND ENVIRONMENTAL CONDITIONS OF GROUPS A AND B

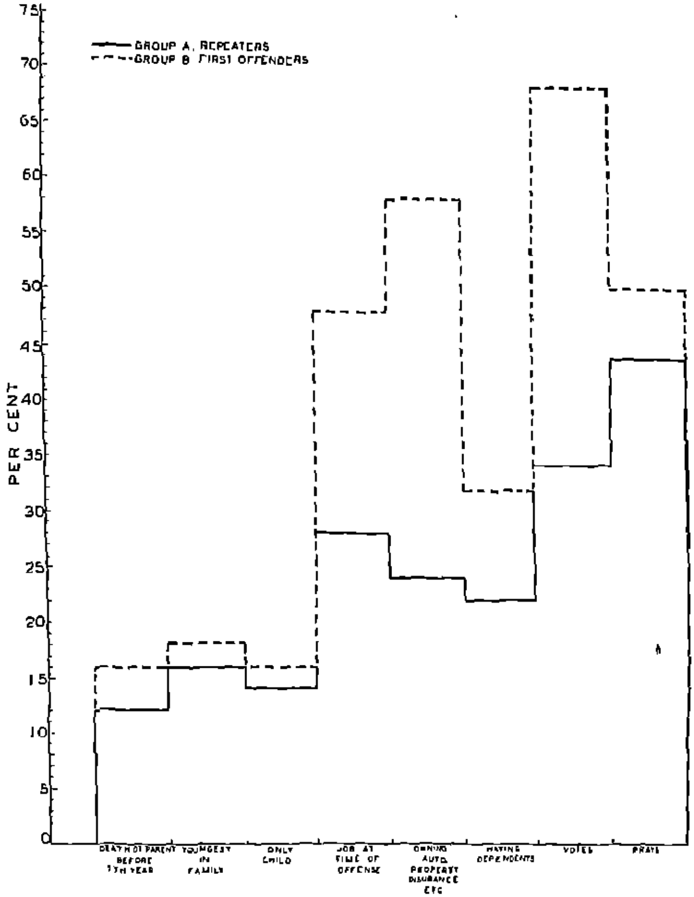

FIGURE 7

Comparison of Further Social and Environmental Conditions of Groups A and B

relations to delinquent behavior. Most investigators have found poor home conditions, marginal economic status, defective family relations, faulty methods of training, unfavorable work experiences, greater geographical mobility, and poorer educational progress associated in varying degrees with delinquent and criminal careers

TABLE 11
Further Comparison

Item	Repeaters N, 50 Mean	σ	First offenders N, 50 Mean	σ	Diff. Means	$\frac{\text{Diff.}}{\sigma_{\text{diff.}}}$
Monthly earnings	74.70	48.08	92.80	39.86	18.10	2.05
Number of places lived	4.42	3.79	5.20	6.87	.78	.70
Years in Los Angeles	8.60	9.79	6.80	7.34	1.80	1.04
Number of jobs held	16.72	28.37	10.00	9.41	6.72	1.59
Grades completed	9.54	2.39	10.58	2.01	1.04	2.36
Number intimate friends	10	25	8	16	2	0.47

(17, pp. 62-66), (27, pp. 111-138), (35, pp. 289-292), (36, pp. 122 ff.).

F. Comparison with Large Unselected Group

On a few sociological items a comparison with a large unselected group (2213 white males between 20 and 24 years of age) is permitted by data available from the "Youth Census Schedule" of the United States Department of the Interior, Office of Education.[23] This study was carried out in 1935 in the City of Los Angeles, and great care was exercised to secure an "unselected" sample. Selecting those members of both of our groups whose ages fell between 20 and 24 years, and those items of information common to both enquiries, we have made certain comparisons presented in tabular form in Appendix J.

The numbers in the groups of repeaters and of first offenders within the age range selected are too small to permit of valid comparisons. But it may be observed from these tables that neither of our groups is representative of the urban male population of Los Angeles of these ages in educational or employment status, and that certain differences in their marital experiences and responsibility for dependents are apparent. Also striking is the disproportionately large number of manual laborers, and of workers at machine or related trades in the ranks both of the prisoners and of their fathers.

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[23] This material was made accessible through the kindness of Dr. Alice Horn, Statistician of the Department of Research and Guidance, Los Angeles Board of Education.

V. SUMMARY AND CONCLUSIONS

A. CASES STUDIED

In this investigation 50 male criminals whose records showed at least three prior offenses were compared with 50 first offenders whose records, habits, and present attitudes were such as to entitle them to probation in the eyes of the court and of the probation officer. All were of the white race, and in age between 20 and 40. The crimes committed were those against property. All were studied while in custody awaiting sentence, after application for probation had been filed.

B. METHODS USED

The methods of investigation chosen were ones closely related to those used in practice in the procedure of selection of cases for probation, but directed toward exploring on a superficial level some of those characteristics found by more searching and extensive psychiatric and psychoanalytic studies to be closely associated with criminal conduct. In order to make possible some rough but quantitative measure of the characteristics studied, the following techniques were adopted: (*a*) The interview method was used, obtaining an expression of attitudes toward various personal and social situations; ratings were made on this interview material on 15 items of a "sociotropic" character; these ratings indicated feelings of dissatisfaction, discontent, or hostility with regard to the community, work, individuals, or groups of individuals, in relation to which the environment of the subjects could in large part be defined; the ratings showed high reliability coefficients when correlated with those of two other raters on the same material. (*b*) Intelligence tests were administered. (*c*) An attempt was made to discover by an indirect method the degree of feeling of difference or separation of the individuals both from their ideal and from their fellows by use of a modification of the "Self-Ordinary-Ideal" Test. (*d*) Superficial ratings were made at the time of interview, and (*e*) such sociological data as were available were compared for the two groups.

C. RESULTS OBTAINED

Of the 15 items sampling attitudes toward the community, work, the political regime, associates, parents and families, and the feeling of remoteness from their own aims and ideals, statistically significant differences in ratings between the two groups were found, showing the repeater to have greater political insurgency, "chip on the shoulder" or feelings of grievance, antagonism toward authority, hostility toward the father, reserve with both mother and father, and to a greater degree lack of integration with the ideal. No significant differences emerged in their degree of dissatisfaction with the community or with work, in tendencies to avoid groups or individual associates, in antagonism toward mother, wife, or children, in intelligence, or in difference scores on the Self-Ordinary-Ideal Test. On the superficial ratings they differed significantly only in "cheerfulness." On the sociological items considered, significant differences between the two groups appeared in the frequency with which parental friction was reported, in economic status as measured by owning an automobile, insurance or any other property than their wages, and in the frequency with which they voted. All differences, even when not statistically significant, were consistent in trend, and were in the "expected" direction. Both groups showed wide dispersion, so that no evidence was found in support of interpretation of criminal behavior on the basis of a "type" characteristic of the confirmed offender.

D. CONCLUSIONS

In the detailed discussion of Part IV we have tried to indicate with what caution the results of this study must be interpreted. But in conclusion we should like to emphasize the positive finding: that marked and significant differences between two selected groups of criminals could be established by methods of sampling attitudes, methods differing from those used by the practicing probation officer primarily in the possibilities of rough quantitative evaluation and control which they afford. For the most part the possible existence of these differences was suggested by the work and theory of psychoanalytically oriented research. And the fact that we have here been able to show the reality of these differences would seem to offer some promise that by the further development of analogous methods the widened insight of analytic researches could be made more generally available to criminological practice.

VI. APPENDICES

APPENDIX A

SECTION 1203, PENAL CODE, SUMMARY DETERMINATION OF PROBATION

After the conviction by plea or verdict of guilty of a public offense in cases where discretion is conferred on the court or any board or commission or other authority as to the extent of the punishment, the court, upon application of the defendant or of the people or upon its own motion, may summarily deny probation, or at a time fixed may hear and determine in the presence of the defendant the matter of probation of the defendant and the conditions of such probation, if granted; if probation is not denied, the court must immediately *refer the matter to the probation officer to investigate and to report* to the court at a specified time, upon the circumstances surrounding the crime and concerning the defendant and his prior record, which may be taken into consideration either in aggravation or mitigation of punishment; the probation officer must thereupon make an investigation of circumstances surrounding the crime and the prior record and history of the defendant and make a written report to the court of the facts found upon such investigaton and must accompany said report with his written recommendations as to the granting or withholding of probation to the defendant and as to the conditions of probation if it shall be granted, and the report and recommendations must be filed with the clerk of the court as a record in the case. At such time or times fixed by the court, the court must hear and determine such application, and in connection therewith must consider any report of the probation officer, and must make a statement that it has considered such report which must be filed with the clerk of the court as a record in the case. And if it shall determine that there are circumstances in mitigation of punishment prescribed by law, or that the ends of justice would be subserved by granting probation to the defendant, the court shall have power in its discretion to place the defendant on probation as hereinafter provided; if probation is denied, the clerk of the court must forthwith send a copy of the report and recommendations to the Board of Prison Directors; further provided, however, that *probation shall not be granted* to any defendant who shall have been convicted of robbery, burglary, burglary with explosives, rape with force or violence, arson, murder, assault with intent to commit murder, attempt to commit murder, grand theft, train wrecking, feloniously receiving stolen goods, felonious assault with a deadly weapon, kidnapping, mayhem, escape from a state prison, conspiracy to commit any one or more of the aforementioned felonies, or any of the aforementioned felonies, and who at the time of the perpetration of said crime or any of them or at the time of his arrest was armed with a deadly weapon (unless at the time he had a lawful right to carry the same), nor to a defendant who used or attempted to use a deadly weapon in connection with the perpetration of the crime of which he was convicted, nor to one who in the perpetration of the crime of which he was convicted inflicted great bodily injury or torture, nor to any defendant unless the court shall be satisfied that he has never in any place been previously convicted of a felony, nor to any public official or peace officer of the state, county, city, city and county, or other political subdivision who, in the discharge of the duties of his public office or employment, accepted or gave or offered to accept or give any bribe or embezzled public money or was guilty of extortion.

APPENDIX B

1. *Description of Preliminary Study.*

a. Good probationers. In the preliminary investigation, the "good probationers" were selected as follows:

Supervising probation officers were asked for lists of men on probation for one year or longer whose records during this time had been without technical violation in such matters as failure to report, failure to make restitution, etc., and whose attitude had been cooperative and constructive. These men were to be of the white race, over 20 years of age and under 45, and granted probation originally after the commission of any one of the following crimes against property: Forgery, checks without sufficient funds, burglary (2nd degree), grand theft, petty theft with prior petty theft, grand theft automobile,[24] receiving stolen property, or robbery. Sex crimes and those explicitly involving intoxication were excluded. In most of these crimes[25] it is the sentence of the Court which determines whether they shall stand as felonies or misdemeanors, a penitentiary sentence rendering them felonies, a jail sentence misdemeanors.[26] To these "candidates" letters were then sent explaining the character of the study to be undertaken and asking if they would show their willingness to coöperate in it by coming in for an interview. They were assured of car fare. Of the number to whom such letters were sent, with a returned stamped envelope and a card to check for convenience in replying, less than 50 per cent replied, made, and kept an appointment for interview.

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[24] Usually a plea of guilty to violation of Section 503 of the Vehicle Code (driving a car without the consent of the owner) is accepted when the original charge is grand theft automobile. This may, then, for practical purposes be regarded as the legal equivalent of grand theft automobile.

b. Violators. The group of violators were interviewed in the County Jail during the period after a violation had been filed against them and before the date of sentence. The range of crimes selected was similar in both groups, and the racial requirement and age limits were the same.

c. Difficulties. After it was discovered that so small a proportion of the good probationers receiving letters responded, the belief was inescapable that this method of selection of cases was in all probability selecting also for some of those "sociotropic" attitudes which it was desired to investigate. For this method made it entirely possible for the more withdrawn and antagonistic good probationers not to reply to the communication received. The violators, on the other hand, being in custody, had no such escape. Also it was believed that the conditions under which the two groups were interviewed introduced a sharp difference, and the fact of incarceration in itself might suffice to induce in the violators certain anti-social attitudes. A further difficulty lay in the ages of the two groups; for while the age limits set for the two groups were the same, it proved to be the older good probationers who responded to the request for interview, and as a result the average age of this group was 37, that of the violators 28. It was therefore decided to abandon the problem in this form.

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[25] The exceptions are: Grand theft, petty theft with prior petty theft, and robbery. These must be sentenced always as felonies.

[26] In *Section 1203 of the Penal Code of the State of California, reproduced* in Appendix *A,* probationable offenses are delimited.

2. *Results of Preliminary Study.*

TABLE 12

DIFFERENCES IN RATINGS ON INTERVIEW MATERIAL BETWEEN VIOLATORS AND GOOD PROBATIONERS*

Item	Violators *N*. 10 Mean	Good probationers *N*. 10 Mean
1. Dissatisfaction with community	2.2	1.0
2. Dissatisfaction with work	2.8	1.9
3. Social behavior: avoiding groups	3.4	2.9
4. Social behavior: avoiding individuals	1.8	1.5
5. Political insurgency	3.2	2.2
6. Social preferences: desire for solitude	2.0	1.2
7. "Chip on shoulder"	2.6	1.4
8. Antagonism toward authority	2.9	2.1
9. Reserve with father	3.5	4.1
10. Antagonism toward father	2.8	3.1
11. Reserve with mother	3.2	3.4
12. Antagonism toward mother	1.9	2.2
13. Dissatisfaction with marriage	2.3	2.4
14. Antagonism toward children	—	0.6
15. Lack of integration with ideal	2.1	1.8

*The numbers were too small to justify computing standard deviations of the distributions or critical ratios for differences in means.

TABLE 13

MEAN DIFFERENCE SCORES IN SELF-ORDINARY-IDEAL TEST

Difference scores	Violators	Good probationers
Between Self and Ideal (Son)	10.0	5.7
Between Self and Average	20.2	18.5

TABLE 14

COMPARISON OF SOME SOCIAL AND ENVIRONMENTAL CONDITIONS

Condition	Violators Per cent	Good probationers Per cent
1. Family relationships		
a. Parents separated	30	20
b. Parents happy	70	70
2. Methods of upbringing		
a. Punished (whipped) at home	30	80
b. Spoiled at home	50	10
c. Supervised at home	60	70
3. Position in family: first born	20	50
4. Religious interest: regular church attendance	10	20
5. Alleged interest in politics	30	30
6. Work: job at present	60	70
7. Married	30	90

TABLE 15

COMPARISON OF OTHER FACTORS

	Means	
	Violators	Good probationers
1. Age	28	37
2. Otis *IQ*	87	94
3. Strictness of father*	3.1	3.9
4. Strictness of mother*	2.9	2.6
5. Grades completed	9.7	10.3
6. Number of close friends claimed	7.9	13.5
7. Years residence in Los Angeles	12.9	11.0
8. Number of jobs held	21.0	21.0
9. Number of groups joined	0.5	1.5

*On five-point scale.

APPENDIX C

1. *Prior Offenses and Disposition of Present Case.*

TABLE 16

PRIOR OFFENSES OF ALL MEMBERS OF GROUP *A*

Offense	Number of occurrences
All juvenile offenses	73
Assault	4
Assault with deadly weapon	4
Battery	2
Breaking and entering	6
Burglary	17
Carrying concealed weapon	2
Car theft	23
Contempt of court	3
Contributing to delinquency of minors	1
Checks without sufficient funds	16
Deadly weapon act	1
Defrauding an innkeeper	2
Disturbing the peace	4
Escape	4
Forgery	4
Gambling	2
Grand theft	24
Impersonating federal officer	2
Jail break (or attempt jail break)	2
Obtaining money, false pretenses	1
Petty theft	31
Receiving stolen property	2
Resisting an officer	1
Robbery	3
State Narcotic Act	1
Trespassing	1
Wright Act Sale or Transportation*	4
	239

*Wright Act Possession was not included as a prior offense, but Wright Act Sale and Transportation were regarded as more active instances of disregard of the law in force at that time.

TABLE 17

PRESENT OFFENSE, SENTENCE, AND PRIOR OFFENSES OF EACH MEMBER OF GROUP *A*[1, 2]

Individual 1. Age 20.	Present offense, Grand Theft (calves) Sentence: San Quentin
Prior offenses:	Burglary (3 times)* Theft calves* Runaway, incorrigible* Theft bicycle* Theft auto* Disturbing peace* Contempt of court (2 times) Petty theft (2 times)
Individual 2. Age 26.	Present offense: Checks, N.S.F.[3] Sentence: County Jail
Prior offenses:	Contributing to delinquency of minor Petty theft (3 times) Contempt of court
Individual 3. Age 25.	Present offense: Grand Theft and Violation 503 V.C. Sentence: County Jail
Prior offenses:	Forgery Robbery Assault Attempt jail break
Individual 4. Age 29.	Present offense: Violation 503 V.C. Sentence: Folsom
Prior offenses:	Runaway (2 times)* Car theft (2 times) Escape Larceny
Individual 5. Age 21.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Car theft* Incorrigible and runaway* Car theft* Violation of probation* Assault and battery

[1] * Indicates juvenile offenses.

[2] No attempt is made to eliminate differences in terminology, since the record obtained from the Finger-print Identification Bureau reproduced the terminology used in the different states in which offenses were committed.

[3] N.S.F. not sufficient funds.

TABLE 17 (*continued*)

Individual 6. Age 21.	Present offense: Checks, N.S.F. Sentence: Probation and Jail
Prior offenses:	Grand theft auto* Violation of probation (theft auto)* Petty theft
Individual 7. Age 33.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Carrying concealed weapon Petty theft Violation 503 V.C. (Wright Act Possession and drunk arrests 5 times)
Individual 8. Age 23.	Present offense: Burglary, 2nd degree Sentence: County Jail
Prior offenses:	Grand theft Violation 503 V.C. Burglary Violation of probation (grand theft auto)
Individual 9. Age 27.	Present offense: Forgery and Checks, N.S.F. Sentence: County Jail
Prior offenses:	Carrying concealed weapon Checks, N.S.F. Defrauding an innkeeper Fictitious checks (2 times) Obtaining money under false pretenses (Now wanted elsewhere: Checks, N.S.F.)
Individual 10. Age 27.	Present offense: Checks, N.S.F. Sentence: Folsom
Prior offenses:	Defrauding innkeeper Fraudulent checks Fictitious checks (3 times) Embezzlement Impersonating federal officer
Individual 11. Age 32.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Burglary (2 times) Grand larceny Petty larceny
Individual 12. Age 36.	Present offense: Burglary Sentence: County Jail
Prior offenses:	Grand Larceny Burglary Escape Jail break (Wright Act Possession, Transportation, and Vagrancy)

TABLE 17 (*continued*)

Individual 13. Age 27.	Present offense: Forgery Sentence: County Jail
Prior offenses:	Violation State Narcotic Act Battery Checks, N.S.F. Resisting public officer Disturbing the peace Wright Act Sale (2 times) (Wright Act Possession, Transportation, and Vagrancy)
Individual 14. Age 35.	Present offense: Forgery Sentence: County Jail
Prior offenses:	Checks, N.S.F. (2 times) Forgery
Individual 15. Age 21.	Present offense: Violation 503 V.C. Sentence: Probation and Jail
Prior offenses:	Car theft* Incorrigible* Violation 503 V.C.* (15 autos stolen) Petty theft
Individual 16. Age 35.	Present offense: Forgery Sentence: Folsom, Life. "Habitual Criminal"
Prior offenses:	Trespassing Larceny Petty larceny Grand larceny (2 times) Receiving stolen property Violation of parole Larceny
Individual 17. Age 27.	Present offense: Checks, N.S.F. Sentence: Probation and Jail
Prior offenses:	Checks, N.S.F.* Grand larceny* Gambling Battery Fictitious checks
Individual 18. Age 38.	Present offense: Forgery Sentence: Folsom
Prior offenses:	Checks, N.S.F. (2 times) Assault with deadly weapon (2 times) Grand larceny Grand theft Violation 503 V.C. (Wanted elsewhere for forgery)

TABLE 17 (*continued*)

Individual 19. Age 25.	Present offense: Violation 503 V.C. Sentence: San Quentin
Prior offenses:	Violation 503 V.C. Burglary Car theft (grand larceny)
Individual 20. Age 22.	Present offense: Burglary Sentence: Probation and Jail
Prior offenses:	Petty theft* Burglary* Impersonating an officer Burglary (Train riding and 2 arrests for vagrancy)
Individual 21. Age 37.	Present offense: Violation 503 V.C. Sentence: San Quentin
Prior offenses:	Violation 503 V.C. (2 times) Burglary
Individual 22. Age 22.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Petty larceny* Larceny of auto (2 times) Petty theft
Individual 23. Age 21.	Present offense: Violation 503 V.C. Sentence: San Quentin
Prior offenses:	Runaway* Burglary* Grand theft auto* Escape Whittier State School* Disturbing the peace* Grand larceny* Petty theft (Wanted elsewhere for robbery and forgery)
Individual 24. Age 30.	Present offense: Burglary Sentence: County Jail
Prior offenses:	Larceny* Burglary (3 times) Breaking and entering (3 times) Larceny (2 times)
Individual 25. Age 29.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Larceny (2 times) Larceny auto Burglary

TABLE 17 (*continued*)

Individual 26. Age 35.	Present offense: Petty theft with prior petty theft Sentence: San Quentin
Prior offenses:	Disturbing the peace (2 times) Petty theft (2 times) Burglary Grand theft auto (Ten arrests for "drunk" and Wright Act Possession)
Individual 27. Age 22.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Grand theft auto* (4 times) Petty theft* Escape from juvenile officer* Burglary (Four arrests for "drunk" and "vag")
Individual 28. Age 22.	Present offense: Grand theft auto Sentence: San Quentin
Prior offenses:	Petty theft* Assault with deadly weapon* Violation 503 V.C. (Wanted elsewhere)
Individual 29. Age 22.	Present offense: Burglary Sentence: San Quentin
Prior offenses:	Runaway* Petty theft* Escape Juvenile Hall* Grand larceny* Larceny Burglary Petty theft (3 times)
Individual 30. Age 37.	Present offense: Checks, N.S.F. Sentence: County Jail
Prior offenses:	Checks, N.S.F. (2 times) Petty theft (2 times)
Individual 31. Age 39.	Present offense: Forgery Sentence: San Quentin
Prior offenses:	Wright Act Sale Wright Act Transportation Assault with deadly weapon Assault (Arrests for "drunk," Wright Act Possession, "Vag," 18 times)

TABLE 17 (*continued*)

Individual 32. Age 28.	Present offense: Violation 503 V.C. Sentence: Folsom
Prior offenses:	Incorrigibility* Breaking and entering (3 times) Escape Shoplifting ("Drunk" and "Vag" 2 Times)
Individual 33. Age 25.	Present offense: Burglary Sentence: County Jail
Prior offenses:	Deadly weapon act Wright Act Sale Assault Petty theft Disturbing the peace
Individual 34. Age 38.	Present offense: Forgery Sentence: Folsom
Prior offenses:	Forgery Checks, N.S.F. (3 times)
Individual 35. Age 24.	Present offense: Burglary Sentence: San Quentin
Prior offenses:	Theft bicycle* Larceny Petty theft
Individual 36. Age 26.	Present offense: Burglary Sentence: Folsom
Prior offenses:	Incorrigible* Petty larceny* (2 times) Runaway Pacific Lodge* Grand larceny* Grand theft and violation 503 V.C.
Individual 37. Age 33.	Present offense: Burglary Sentence: County Jail
Prior offenses:	Petty larceny (3 times) Grand larceny
Individual 38. Age 29.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Car theft* Car theft Petty theft
Individual 39. Age 27.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Petty theft Burglary (2 times)

TABLE 17 (*continued*)

Individual 40. Age 21.	Present offense: Violation 503 V.C. Sentence: San Quentin
Prior offenses:	Robbery[a] Burglary[a] Runaway Ione[a] Burglary
Individual 41. Age 24.	Present offense: Forgery Sentence: County Jail
Prior offenses:	Burglary[a] Dyer Act Forgery ("Vag" 3 times)
Individual 42. Age 21.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Burglary (2 times)[a] Petty theft Larceny bicycle Attempt petty theft
Individual 43. Age 24.	Present offense: Violation 503 V.C. Sentence: Folsom
Prior offenses:	Runaway (3 times)[a] Violation probation[a] Escape Detention Home (2 times)[a] 503 V.C.[a] Grand theft auto[a] Robbery[a] Assault with deadly weapon
Individual 44. Age 33.	Present offense: Checks, N.S.F. Sentence: Folsom
Prior offenses:	Grand larceny Violation 503 V.C. Grand theft Escape Gambling Dyer Act
Individual 45. Age 26.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Burglary[a] Petty theft Grand theft auto Bank Robbery

TABLE 17 (*continued*)

Individual 46. Age 33.	Present offense: Receiving stolen property and Violation 503 V.C. Sentence: San Quentin
Prior offenses:	Grand larceny Larceny Dyer Act
Individual 47. Age 24.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Larceny auto* Dyer Act Robbery
Individual 48. Age 20.	Present offense: Violation 503 V.C. Sentence: County Jail
Prior offenses:	Incorrigible, truant* Petty theft* Suspicion burglary* Violation 503 V.C.
Individual 49. Age 21.	Present offense: Burglary Sentence: County Jail
Prior offenses:	Carrying concealed weapon* Burglary* (2 times) Grand larceny
Individual 50. Age 32.	Present offense: Burglary Sentence: County Jail
Prior offenses:	Petty theft* Petty larceny Reciving stolen property

TABLE 18

DISPOSITION OF ALL CASES IN GROUP *A*

Sentence	Number
County Jail	26
Folsom	9
Probation and Jail	4
San Quentin	11
	50

TABLE 19

DISPOSITION OF ALL CASES IN GROUP B

Disposition	Number
Probation and Jail	31
Straight probation (no jail)	19
	50

APPENDIX D

SAMPLE INTERVIEWS

Repeater 1. Age 20. Grand Theft (Cattle) 25 or 30 counts.
IQ, 101. 7-10-36.

1. *How long have you lived in Los Angeles?*
All my life. I was born here. I was 20 in June. (Born June 19, 1916.)

2. *Do you feel as if you belonged here? If you went away would you want to come back?*
That's my trouble, I just come back all the time. I get kind of homesick for it here. It seems like I can't live anywhere else. I had a job in Oregon, but I came back here. I had a job in San Francisco. But I hate fogs. I don't think there's any city compares with this. I always brag about it. In Oregon it rained at least two hours every day. In Eugene it was hailing all the time, great big hail stones.

3. *In how many different places have you lived during your life?*
Well, I've never really lived in other places. I've gone away, just for short times. For instance, I once stayed in San Francisco two or three months. And then I was out at Girard for a year at Pacific Lodge. But that was in Los Angeles County. (He had been placed there by Juvenile Court.) I thought the Pacific Lodge was a fine place.

4. *Would you like to return to any of them? Which? For what reasons?*
(Omitted.)

5. *Would you prefer to live in the city or in the country?*
In the city.

6. *Do you like your present job? What is it?*
The last job I had was in Oregon in a logging camp. I was loading the logs on. I worked there about a week. It didn't pay enough. I gave that up May 1st. Before that I was buying and selling cattle. I didn't like that too well. I really never had a job I liked.
   a. *Have you worked mostly at the same kind of job or different ones?*
   The same one pretty much, buying and selling cattle. Once I went to work for the Continental Can Company. But I only worked there two weeks. I bought myself a truck and quit. In San Francisco I was laying hardwood floors, you know, oak, with patterns in them.
   b. *Which kind have you liked best?*
   (Omitted.)
   c. *About how many jobs have you held during your life?*
   Oh, about four or five different jobs.

7. *If you had your choice, what kind of work would you like best?*
I'd like selling, or otherwise, study up some kind of course like me-

chanics. I've always thought of Diesels. If I had money I'd like to study law. I'm ashamed I didn't. I had the opportunity. But I didn't have sense enough to do it. I think I'd have liked that.

8. *Have you been a member of any clubs or organizations or groups here or where you lived earlier? (None, 1, 2 or 3, 4 or more) What kind?*
   No, just football clubs when I was playing football.
9. *How long did you belong?*
   One semester.
   a. *Did you go to the meetings?*
      Yes.
   b. *Did you ever hold office?*
      I was sergeant-at-arms.
10. *Do you vote?*
    No, I'm not old enough yet.
11. *Do you care much about politics?*
    I like to read about it. It's interesting to know, like the other day when the chief of police, what's his name, Chief Davis, gets up and says there's no gambling in Los Angeles. Everybody knows that's a lie. Why there's all kinds of gambling. Reading the papers is the only thing I do in here.
    a. *Do you think the country is being run right?*
       I'm not a Communist. I'm a Democrat or Republican, I can't decide which. I think things are going all right, I think they're picking up.
12. *Do you believe that rich people usually get their money unfairly?*
    Well, I'd say they did it within the law, but that nobody ever amassed a fortune unless trickery was used.
13. *Do you go to church? (Regularly, irregularly, not at all) What church?*
    No ma'am. Oh, I go when there's a Russian feast in honor of my family, but not usually. I was brought up a Molokan. They don't believe in images or emblems. They're very strict. They're a branch of the Greek Orthodox. They believe in the Trinity and all that. My mother was devout, but not my father. She'd want to go to church and he wouldn't take her. I was religious until I was about twelve.
14. *Do you pray often?*
    No ma'am, I don't.
15. *Have you had a fair deal?*
    a. *At the time of your arrests and trials?*
       I was too young to remember my earliest ones. I just forgot about 'em. That time in El Monte I didn't get a fair deal, when I got probation. I pleaded guilty to petty theft instead of grand theft. The woman signed the bill of sale all right. I wasn't guilty. I shouldn't have plead guilty.
    b. *During your probation period or in between arrests?*
       Oh yes, during my probation period I did.
    c. *Before that time, in your early life?*
       No, I don't think I did. If I didn't live in Belvedere I wouldn't have associated with boys older than I. I was the youngest, and daring. I'd take the dares. I wasn't afraid of anything and I'm not now. But then I was too young to know any better. I was made the goat. A lotta times I wouldn't say nothing about the other kids. I'm not scared of anything. But these boys would just get me into things. I don't think I've had a fair deal at home either through my father. I was always at war with him. He'd never ask me things in a

friendly way. He'd bluster about the house. There was always antagonism between me and my father, since I was a little kid.

16. *How many close friends have you? (None, 1, 2 or 3, 4)*
I've got so many I don't think I've got any. If I walked out of here with $1000 I'd have a lot. But otherwise none.

17. *Could you trust them to help you out in a pinch, even when it would be hard for them?*
No, I don't think so. Maybe two of them would. I've always been a chump. I'm just beginning to see it, counting on people the way I have.
    a. Would you do the same for them?
    Oh yes, I'm different there. I always did it. I'm more or less too kind hearted.

18. *Would you rather be alone or with other people?*
I like company.
    a. Which things do you prefer to do alone; which with other people?
    I like to go hunting alone. When I'm working I don't like to be bothered. I like to go to a show by myself, or to buy my clothes. I like to be alone then. But other times I like to be with people.

19. *Are you in fact alone much? What proportion of the time?*
I don't think so. Oh, about half the time, maybe.

20. *How old were you when you started school?*
I started kindergarten when I was three or four; the first grade at four or five.
    a. When you left?
    Around sixteen or seventeen.
    b. What grade did you finish?
    Eleventh or senior B, I forget which. My credits were scattered.

21. *Did you mind stopping?*
Not when I left. I missed it afterward.
    a. Did any teacher ever pick on you?
    Oh yes, in school I didn't get along with the athletic teacher; and a man in junior high school held everything against me. I was just no good. When there was any trouble I was the first to be questioned. They never gave me a chance. They just questioned me and suspected me of everything. So I just figured I'd do the way I pleased since everybody thought the worst of me anyway.
    b. Did other children like you?
    Oh yes, I was pretty well liked in school.
    c. If you had it to do over again would you go farther in school?
    Oh yes, I think I would. I think I'd do well in law. I wish I'd gone through college.

22. *What was your father's business?*
My father is rough and uncouth. I never did like him. He's a cabinet maker. He's smart enough at that. In positions he's had they've always tried to hold him. I helped him when I was about sixteen.
    a. Was he very strict with you when you were a child?
    He was too strict. He was rough, he'd "rare" right up. He thought he was king of the house. Instead of treating us like children he'd treat us like something else. I think I'd a made a better go at it if my father had been a little like my mother. Or like my uncle, my mother's brother. I'd always compare the two of them.
    b. Your mother?
    She was rather strict.

c. Did either whip you or nag at you? (Father or mother.)
My father, he whipped me even when I was fifteen or sixteen and buying and selling for him. He always nagged at me, too, all the time. My mother never whipped me. And she wasn't so bad at nagging.

d. Were you afraid of your father?
I was until I was seventeen or eighteen.

e. Were you afraid of your mother?
She never gave me cause to be afraid of her.

f. Are you like either of them?
I'm most like my mother's side. I look like my father, though.

g. Are you glad of this?
Oh sure, I'm glad. I'm like my mother's side. Now my brother, he looks like the Samuranovs[27] and acts like my father.

h. What were the things you liked (and disliked) about your father?
Nothing. I disliked everything about him.

i. What were the things you liked and disliked about your mother.
Well, she was so good. She'd say she wouldn't give me money to go to a show, then I'd coax her and she'd let me. She was so kind. She showed no partiality.

23. *Did either of them have it in for you?*
My father always did have it in for me.

a. Did either spoil you?
No, I don't think so.

b. Did you think other children's fathers were nicer than yours?
Oh yes ma'am. I'd compare my father with my Uncle Bill. I always thought I'd amount to something if he was my father.

c. Did you think other children's mothers were nicer than yours?
No.

d. Did they pay very much attention to you?
My father always wanted to find something wrong with me. That was the kind of attention he paid to me. My mother, she always worried. She devoted a good deal of time to us.

e. Were they affectionate with you?
No, neither of them was.

24. *Did you tell either of them everything about yourself or many of the things you were thinking?*
No ma'am; I always kept things to myself. I never talked to them much about things.

25. *Do you wish you had been more or less strictly raised?*
Let's see now. My uncle, he was strict, but always jolly. That appealed to me. It wasn't so much a difference in strictness as a difference in tone. If I'd been asked to do things in a kind tone instead of by brute strength.

a. In what ways do you wish they had treated you differently?
Well, that was one way. I wish they'd used kind ways with me instead of force. Then another was, I wish I'd been brought up in a smaller family. The only ones I really like are Vana, Ivan and Joan. Then it all goes to my father. I wish he'd treated me different every way. I'd get pleasure in doing things for my uncle.

26. *Were your father and mother separated?*

a. How old were you?

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[27] All names of prisoners and their relatives are fictitious.

Yes, just a year and a half or two years ago. I was about eighteen.

b. Did either remarry?

No, they're not even divorced, I think. I never understood it myself. In our religion we don't believe in divorce.

c. Did they get along well together?

My brother and I got in between them. You see, my father wouldn't correct hisself, even if he was wrong. He'd never admit it, he'd always have to act as if he'd been right all along. They argued together. Once he slapped her. It musta been a year or two or three maybe that they didn't get along. He's just no good. I don't think they got along very good ever, although my mother was in love with him.

27. *Did they generally have the same kind of ideas or different?*

Different.

a. Whose did you like best?

My mother's all the time. I was more or less by myself, not exactly close to my mother. More or less I kept a secret to myself. I know I liked my mother better than my brother Edward, but he'd show it more. My mother used to say that Edward acted as if he loved her more. But he was just like that, he showed it more.

28. *In what ways do you want your child's training to be like yours or different?*

Well, I know I'd move out to a better neighborhood where decent people live, quieter, no roughnecks. Belvedere is bad that way. It's an awful neighborhood. Then I'd be more or less a pal to him than a father. If I'd go fishing I'd take him with me. I'd reason with him, not whip him. I'd give him lots of liberty. If I thought he'd done wrong I'd not whip him but reason with him. I'd tell him about my troubles when I was young.

29. *How many older brothers or sisters have you?*

There was nine of us altogether. There was just one brother older than I. Then there were seven younger, two boys and five girls.

a. Younger?

(Omitted.)

b. Have they ever had it in for you?

No. I could whip my older brother, run him around the house. We had a time until I got the upper hand. Then he knew it and there wasn't any more trouble.

c. Did you get along well together.

My brother and I never did get along. He acts like my father. He'd borrow money from me and not give it back. I guess I got along pretty well with the rest.

30. *Do you and your wife get along well together?*

a. About what kind of things do you agree and differ?

(Not married. Relations with girls since seventeen. Had been in love with two of them.)

31. *Have you children?*

a. How old are they?

b. Do they resemble you?

(Omitted.)

Nails bitten:

There's nothing else to do in here. I just did that since I came in here.

Concerning present offense:

I just went out and stole twenty-five or thirty calves. I took a truck. They were out in pasture and I'd just take them off in the truck. *I tried to get a job, I went to twenty different places.* Then I just thought well if I couldn't get a job I'd steal. I was about to get a job with the Chrysler Motor Company. But I didn't know for sure, or I wouldn't a gotten into this trouble.

(Speaks Russian fluently. Doesn't read it. Speaks English without an accent. Boastful, self-assured.)

Ratings on Interview.

1.	Dissatisfaction with community	1
2.	Dissatisfaction with work	5
3.	Social behavior: avoidance of group activities	4
4.	Social behavior: avoidance of individual contacts	1.5
5.	Social preferences: insurgency	4
6.	Social preferences: desire for solitude	2
7.	Chip on shoulder	4.5
8.	Antagonism toward authority	4.5
9.	Reserve with father	5
10.	Antagonism toward father	5
11.	Reserve with mother	5
12.	Antagonism toward mother	1
13.	Dissatisfaction with marital experiences	–
14.	Dissatisfaction with children	–
15.	Lack of integration with ideal	5

Repeater 35. Age, 24. Attempt Burglary. *IQ,* 78. 12-22-36.

1. *How long have you lived in Los Angeles?*
   Since September, 1935. Fifteen months.
2. *Do you feel as if you belonged here? If you went away would you want to come back?*
   As much as any other place. I've been here longer than I have most places. Usually I stay very brief times in places.
3. *In how many different places have you lived during your life?*
   A great many. Oh, twenty-five or thirty, I'd say.
4. *Would you like to return to any of them?*
   No, I couldn't say so.
   a. *Which? For what reasons?*
   (Omitted.)
5. *Would you prefer to live in the city or in the country?*
   I don't know. I haven't lived in the country since I was a kid. It's usually been around towns and cities.
6. *Do you like your present job? What is it?*
   I'd been out of work about a year. Before that for four months I was driving a truck. I was very glad to have work. I got $12 a week. I liked the Army for the first year and a half. Then I got into

trouble with a superior officer and didn't like it. I can do labor. That's about all.

a. Have you worked mostly at the same kind of job or different ones?
I've worked at anything I could get. I've distributed handbills, been bus boy in a cafe, driven a truck—anything. But I've been in prison so much and reform schools that I don't know how to go about getting jobs. In reform schools and prisons and the army people always tell you what to do. You don't learn how to do things for yourself. When I try to get a job I fire myself before I get it.

b. Which kind have you liked best?
I never did any kind of work I "liked best."

c. About how many jobs have you held during your life?
Not over four, outside of the army. I just haven't had any chances to work.

7. *If you had your choice, what kind of work would you like best?*
I have ideas—but I don't see what that has to do with probation. It'd sound silly if I told about it. I couldn't speak of it.
(Admitted later he had wanted to be an aviation mechanic or flyer. Says he has always been interested in mechanical things.)

8. *Have you been a member of any clubs or organizations or groups here or where you lived earlier? What kind?*
No.

9. *How long did you belong? Did you go to the meetings? Did you ever hold office?*
(Omitted.)

10. *Do you vote?*
No.

11. *Do you care much about politics?*
Not very much.

a. Do you think the country is being run right?
If it isn't run one way it's run another. It's not right, but they probably do it the best they can.

12. *Do you believe that rich people usually get their money unfairly?*
That's something I've never had any experience in. I've never thought anything much about it.

13. *Do you go to church? What church?*
Irregularly. Just once in a great while. I was brought up a Baptist.

14. *Do you pray often?*
I don't know. I don't know what praying is.

15. *Have you had a fair deal?*

a. At the time of your arrests and trials?
I've always lacked the courage or something, I guess, to do what I should. They say a man gets what he deserves. So I must've deserved what I got. At fourteen I got into a reform school for two years. And I never have got over the effect of that. It was such a shock. The first week they put me out to pick fifty pounds of cotton. I couldn't do it. It was the first time I'd picked cotton. The boss was a dope fiend. And he beat me, gave me terrible lashings. That happened ten times, the beatings. I got so I never had another thought except to run away. I tried to, but I never got away with it.

b. During your probation period or in between arrests?
I've never had a parole or probation period. But people have given me breaks, good breaks, more than I deserved. But I let

them down. It seems like I don't know how to live on the outside. I get kind of paralyzed. And I have a way of repelling friends. Today you just happened to catch me in the right mood. But I won't make friends, I don't know how. I'd never think of coming over to see you or anyone, for instance, after I got out of here to ask for help in finding work. It would be the last thing in the world I'd do. I've got to get myself out of my difficulties. When I committed this crime I was just discouraged, that's all. I didn't have anything to lose by getting caught and getting in jail. I just didn't care. In a way it's a kind of a relief to be in jail.

c. *Before that time, in your early life?*
My folks were ignorant, that was all. They did the best they could. They didn't know how to raise their family. They had eight of us and didn't know what to do with us.

16. *How many close friends have you?*
A couple of close friends, ones I made in prison. I haven't made any friends on the outside.

17. *Could you trust them to help you out in a pinch, even when it would be hard for them?*
I think I could, those two.
a. *Would you do the same for them?*
If it was in my power.

18. *Would you rather be alone or with other people?*
It depends on the circumstances. Sometimes I like to be alone, sometimes with other people.
a. *Which things do you prefer to do alone; which with other people?*
I like to work alone; I can think best then. I like to do burglaries alone—oh I don't *like* to do them, of course, but I like to be alone if I do. I like to read alone.

19. *Are you in fact alone much? What proportion of the time?*
I've been alone practically all the time since I got out of prison.

20. *How old were you when you started school?*
Nine.
a. *When you left?*
Fourteen.
b. *What grade did you finish?*
I was in the high sixth.

21. *Did you mind stopping?*
No. At that time I wasn't enjoying my studies.
a. *Did any teacher ever pick on you?*
No ma'am. But I picked on all of them all right.
b. *Did other children like you?*
In a certain crowd they did. I had friends in school.
c. *If you had it to do over again would you go farther in school?*
Yes ma'am. If I could. I still want to take some more training. In the reform school they tried to make me go to school. But I was so upset and worried and confused that I couldn't concentrate. The only good trade work was in laundry and baking. And they wouldn't let you choose.

22. *What was your father's business?*
He worked in oil fields. I don't know much about that kind of work.
a. *Was he very strict with you when you were a child?*
He wasn't strict. But I was afraid of him. He was a drunkard.
b. *Your mother?*

She was a little more so, in the sense that she really tried to do right by us and looked after us.

c. *Did either whip you or nag at you?*
You'd not exactly call it whipping. You know how it is when a person is drunk. They beat you and do all kinds of things like that. They didn't nag so much.

d. *Were you afraid of either?*
Of my father, yes, when he was drunk and when he was getting over it. And he was that way most of the time.

e. *Are you like either of them?*
I don't think so.

f. *Are you glad of this?*
(Omitted.)

g. *What were the things you liked and disliked about your father?*
You'd maybe not say *disliked*, but he was always drunk, cruel, never home. He didn't take any interest in his family. You see, we were very, very poor and ignorant. We lived under the worst conditions in the worst places. We never had any friends.

h. *What were the things you liked and disliked about your mother?*
There wasn't anything I disliked about her. She tried to do her best. I feel as if I ought to help 'em now, feel guilty that I don't and that I can't get a job. It's not that I really *want* to help 'em, but I feel as if I *ought* to want to, like it's my duty.

23. *Did either of them have it in for you?*
No.

a. *Did either spoil you?*
There wasn't anything like that.

b. *Did you think other children's fathers were nicer than yours?*
I'm afraid I did. I'd see other boys having things and I'd want 'em and I'd envy them.

c. *Did you think other children's mothers were nicer than yours?*
No.

d. *Did they pay very much attention to you?*
No. There was too many of us. There wasn't time, except that my mother, she was so scared, so scared we'd get into trouble or that something would happen to us, so she kept me cooped up all day in the back yard. That was no way to get along. She had to keep her eye on me all the time.

e. *Were they affectionate with you?*
No, nothing like that.

24. *Did you tell either of them everything about yourself or many of the things you were thinking?*
No, nothing. Not to either of them. Sex and things like that, they were tabu—isn't that what you'd call it? I wouldn't have thought of talking to them about things.

25. *Do you wish you had been more or less strictly raised?*
I wish I'd had somebody to bring me up sharp sometimes, right at the start. I think I'd be better if it had been a little more strict.

a. *In what ways do you wish they had treated you differently?*
I wish I'd been born into different conditions, that my life at home had been all different. I went back home again in 1935, thinking things would be better. They was worse. My father couldn't get work a lot of the time, couldn't get a job.

26. *Were your father and mother separated?*
    No. They stayed together. My mother, she was afraid to leave because she had so many kids to feed.
    a. How old were you?
        (Omitted.)
    b. Did either remarry?
        (Omitted.)
    c. Did they get along well together?
        No. It was awful. It seems as if it did something to me, left me so confused like. I'm still that way, all mixed up. Maybe it's because it was that way at home. That's maybe why I'm so unstable.
27. *Did they generally have the same kind of ideas or different?*
    They practically always disagreed.
    a. Whose did you like best?
        Seemed like I was on my mother's side.
28. *In what ways do you want your child's training to be like yours or different?*
    I'd want it to be altogether different. But that's something I never thought about very much. I don't want to have any children. I can't take care of myself, much less of any children.
29. *How many older brothers or sisters have you?*
    None. I was the oldest of eight.
    a. Younger?
        Two brothers, five sisters.
    b. Have they ever had it in for you?
        Oh no ma'am.
    c. Did you get along well together?
        We fought quite a bit, like all families.
30. *Do you and your wife get along well together?*
    a. About what kind of things do you agree and differ?
        (Not married.)
31. *Have you children?*
    a. How old are they?
        b. Do they resemble you?
        (Omitted.)
    At end of interview said:
        If you know what's the matter with me I wish you'd tell me. Well, it's done me a little good to talk this way. But I'm not worth wasting much time on.

Ratings on Interview.

1. Dissatisfaction with community	3
2. Dissatisfaction with work	5
3. Social behavior: avoidance of group activities	5
4. Social behavior: avoidance of individual contacts	5
5. Social preferences: insurgency	3.5
6. Social preferences: desire for solitude	3
7. Chip on shoulder	2
8. Antagonism toward authority	3.5
9. Reserve with father	5

10. Antagonism toward father	4
11. Reserve with mother	5
12. Antagonism toward mother	3
13. Dissatisfaction with marital experience	–
14. Dissatisfaction with children	–
15. Lack of integration with ideal	5

First Offender 43. Age, 26. Forgery. *IQ*, 113. 8-19-36.

1. *How long have you lived in Los Angeles?*
   Since 1920.
2. *Do you feel as if you belonged here? If you went away would you want to come back?*
   I already know that if I went away I would want to come back. I went away once in 1933, and I came back. Oh yes, I like it here.
3. *In how many different places have you lived during your life?*
   Only three—Colorado when I was very, very small, Chicago, and California.
4. *Would you like to return to any of them? Which? For what reasons?*
   No, if there's a preference I'd much prefer Los Angeles. I feel at home here.
5. *Would you prefer to live in the city or in the country?*
   I'd prefer to get away from the center of the city, out toward Inglewood, not too far out. I like the region between Slauson and Florence out at La Brea.
6. *Do you like your present job? What is it?*
   When I was arrested I'd been out of work about six weeks. I was working for the Department of Light and Power before that. I liked it. But we were living beyond our means and I was getting too little. When I was arrested there was a job that was going to open up within two days. I had taken an examination and passed it, and this job was pretty definite.
   - *a. Have you worked mostly at the same kind of job or different ones?*
     Always at the same kind of work, along electrical lines. I'd be called an electrical technician.
   - *b. Which kind have you liked best?*
     I wouldn't do anything else.
   - *c. About how many jobs have you held during your life?*
     Well, let's see, there have been about six. The third was in the radio department of Barker Brothers. I was there six years. All of them were all right except the first two.
7. *If you had your choice, what kind of work would you like best?*
   The same kind I do. I went to Los Angeles high school and to the Frank Wiggins trade school. That's a good school. I learned a lot there and got a good training. Los Angeles is one of the few cities that has a trade school like that.
8. *Have you been a member of any clubs or organizations or groups here or where you lived earlier? What kind?*
   No established or recognized ones. Just school organizations, like radio clubs.
9. *How long did you belong? Did you go to the meetings? Did you ever hold office?*
   (Omitted.)

10. *Do you vote?*
    Yes, I do.
11. *Do you care much about politics?*
    Yes, to the extent of reading about it all. My wife and I vote just the opposite tickets and just cancel each other's vote. We argue a lot about politics. She's a staunch Democrat and Catholic and I'm a Republican.
    a. Do you think the country is being run right?
    Yes, I believe I do. I think Mr. Roosevelt is a very fine man. Of course the problems are all too complicated for me to have an opinion But I don't feel worried or upset about the condition of the country. I'm not qualified to know much about it all.
12. *Do you believe that rich people usually get their money unfairly?*
    I think on the average it's acquired fairly. They have luck because they have fine keen brains. Of course occasionally it's gotten unscrupulously. But you can't expect the person without education and training to make money. And people do lots of good with money, some of them, in the way they spend it, the foundations they create, and things like that.
13. *Do you go to church? What church?*
    Irregularly. I go to church with my wife, to the Catholic church. It depends on whether the baby is asleep or not. I was brought up a Baptist.
14. *Do you pray often?*
    Not an awful lot. But I do some.
15. *Have you had a fair deal?*
    a. At the time of your arrests and trials?
    Absolutely. They were very, very considerate, everyone. The police were too. I believe the police are human. They'll meet you half way and if you behave reasonably they'll treat you all right. I had meant to clear up these checks. I wasn't able to. One firm to whom I gave one of the checks was going to turn it in to the police. I knew this and so I went and gave myself up. There's only one thing about the police—I think the Central Station should be better kept. Here it's clean and the food's wholesome, but the Central Station is terrible.
    I didn't let my wife know I'd lost my job. I just had to have some money for our expenses. I knew I was going to get this other job in a few days, and I meant to clear up these checks then.
    b. During your probation period or in between arrests?
    (Omitted.)
    c. Before that time, in your early life?
    Yes, I had every advantage. Only I do believe it's an advantage if a family can stay together. I think they're stronger so. But my mother and father separated in 1922. They just couldn't get along together. I was fourteen then. As it was I lost no advantages. But I was fond of them both and it was hard when the family broke up.
16. *How many close friends have you?*
    Intimate friends, only two really. I have lots of friends. But only two close. (?) Oh my wife's more than a friend—a lot more than that. Yes she's a friend too, but a lot more. (Eyes fill with tears.)
17. *Could you trust them to help you out in a pinch, even when it would be hard for them?*

Absolutely. They are now.

a. Would you do the same for them?

Oh yes.

18. *Would you rather be alone or with other people?*

I like to be with people I know, but I don't like crowds. I feel out of place with strangers.

a. Which things do you prefer to do alone; which with other people?

That's hard to answer. I like to read alone. I like reading very much. I like to work alone too. I don't look for other people. With other people I think. I enjoy conversation as much as anything else.

19. *Are you in fact alone much? What proportion of the time?*

Not an awful lot.

20. *How old were you when you started school?*

Six.

a. When you left?

In 1929. I was nineteen.

b. What grade did you finish?

Part of the twelfth. The last year I was going to trade school too and the year following that. I had hard luck, I didn't graduate because I lost some credits by transferring from Harvard Academy to Los Angeles high.

21. *Did you mind stopping?*

No. I couldn't go any further there. But I thought it was better to stop and work. My mother and I were in a tight spot.

a. Did any teacher ever pick on you?

Oh no.

b. Did other children like you?

I get along with people well. At least I wasn't left out.

c. If you had it to do over again would you go farther in school?

If I had the opportunity I'd like nothing better than going to college. But I couldn't possibly afford it as it was. I realized when I was with the Water and Power Department what a college education meant and what an advantage it was to you.

22. *What was your father's business?*

He studied medicine, practiced a short time in New York. Then he went into printing. Out here he went into politics. He was with the Los Angeles Traffic Commission until 1929. He was executive secretary. Then he was sent to San Quentin in 1929. He got into some kind of trouble. I never understood very well just what his part in it was. There was some misappropriation of public funds. And he was involved.

a. Was he very strict with you when you were a child?

Rather. He was stricter than my mother.

b. Your mother?

Average.

c. Did either whip you or nag at you?

I got what punishment was due, from both of them. But no more than I deserved. There was no nagging.

d. Were you afraid of either?

No.

e. Are you like either of them?

Not an awful lot. I think I resemble my mother more. But she's light and my father's dark.

f. Are you glad of this?

Yes.

g. *What were the things you liked and disliked about your father?*
I liked him because I could always take him into my confidence and he'd do what he thought was best. He always saw to it that I had plenty of enjoyment out of life. He took me down to the traffic commission and let me do odds and ends and I had the run of the place. I'd go down to the streets that they were working on, that weren't yet paved. And I'd have a fine time. It was nice of him. Lots of fathers wouldn't take their kids around in their business. I used to feel sorry for him. He was domineered by my mother and other people. I haven't seen him since his release. He went to Chicago then and didn't get in touch with us again. I see how he feels. He didn't want to be around his children, he felt the disgrace of it so. I'd feel that way if I were in his place. You see, there was lots of publicity about it. That's why I left the Harvard Academy. It was a private school, not very large, and everybody knew about it. But it's wonderful the spirit my father has. He went into business and he's still going up. He's very far above the average in intelligence.

h. *What were the things you liked and disliked about your mother?*
There was only one thing I disliked about her. She's a little bit vain. That's not very nice to say about your mother. But I think it's true. She's a very beautiful woman. We were very close in our relationship.

23. *Did either of them have it in for you?*
No-oh.
   a. *Did either spoil you?*
   Both of 'em did.
   b. *Did you think other children's fathers were nicer than yours?*
   No.
   c. *Mothers?*
   No.
   d. *Did they pay very much attention to you?*
   Quite a bit, both of them.
   e. *Were they affectionate with you?*
   Very. Father was very much interested in my school work. He should have studied newspaper work instead of medicine. He wanted to be sure just what he did want to do. So he experimented around for the first few years.

24. *Did you tell either of them everything about yourself or many of the things you were thinking?*
Yes, I had full confidence in them. I'd confide in them every time there was occasion to, in both of them.

25. *Do you wish you had been more or less strictly raised?*
I think it was pretty nice the way it was.
   a. *In what ways do you wish they had treated you differently?*
   I think they did as near right as it was possible to do. I hadn't too much money. But I had some. Father always saw that I had a regular allowance.

26. *Were your father and mother separated?*
Yes; when I was fourteen.
   a. *How old were you?*
   (Omitted.)
   b. *Did either remarry?*

My mother did, just recently, about a year ago. I was married then, so it had no influence whatever on me.

c. *Did they get along well together?*

Very well.

27. *Did they generally have the same kind of ideas or different?*

They seemed to be the same. There wasn't any clash there.

a. *Whose did you like best?*

It varied. I was really too young to take sides.

28. *In what ways do you want your child's training to be like yours or different?*

I'd train him in the same way I was trained, except that I'd try to keep the family intact. It will be better for him having a sister. I wouldn't force him to go to college if he didn't want to, but if I'm able I want to give him a chance to go if he would like to.

29. *How many older brothers or sisters have you?*

None. I'm an only child.

a. *Younger?*

(Omitted.)

b. *Have they ever had it in for you?*

(Omitted.)

c. *Did you get along well together?*

(Omitted.)

30. *Do you and your wife get along well together?*

Beautifully. We've never been separated until this. We have arguments the same as everybody else, but it's always constructive. We married in March, '34. She's a year younger than I am.

a. *About what kind of things do you agree and differ?*

About politics we definitely differ. She's a Democrat; I'm a Republican. But I can't really answer that question very well.

31. *Have you children?*

Yes, Tanya, eighteen months; and my wife is seven or eight months pregnant. I hope the next one will be a boy.

a. *How old are they?*

(Omitted.)

b. *Do they resemble you?*

She looks more like me than like her mother. She's just at the cutest stage now.

(Showed letter from wife, who is obviously very devoted to him, and rather desperate from lack of money and his imprisonment and her own poor health. Wife just took job with Robinson's for a short time.)

Ratings on Interview.

1.	Dissatisfaction with community	1
2.	Dissatisfaction with work	1
3.	Social behavior: Avoidance of group activities	3.5
4.	Social behavior: avoidance of individual contacts	3
5.	Social preferences: insurgency	1.5
6.	Social preferences: desire for solitude	3
7.	Chip on shoulder	1
8.	Antagonism toward authority	1

9.	Reserve with father	1
10.	Antagonism toward father	1
11.	Reserve with mother	1
12.	Antagonism toward mother	1
13.	Dissatisfaction with marital experience	1
14.	Dissatisfaction with children	1
15.	Lack of integration with ideal	1

First Offender 49. Age, 30. Checks, N.S.F. *IQ*, 107. 8-20-36.

1. *How long have you lived in Los Angeles?*
   I've never lived here. I've only visited here ten days. I was on my vacation and came out to visit some friends at KNX.
2. *Do you feel as if you belonged here? If you went away would you want to come back?*
   Oh no. Although I like the climate and I believe I could make money and get good work out here. I've been broadcasting over the "Calling All Cars" program. On June 15th I was on the same program with Biscailuz. And I've been on other programs with Herbert Marshall and some other movie people. I just couldn't resist when they offered me such good pay for it.
3. *In how many different places have you lived during your life?*
   In Birmingham, Ala., Buenos Aires, Bridgeport, Conn. and Shreveport. At present my wife and baby are in Shreveport. Let me explain, I mean that in these places I've mentioned I've stayed long enough to establish residence.
4. *Would you like to return to any of them? Which? For what reasons?*
   I'm absolutely satisfied with Shreveport. I've got a blemish on my name now there because of this experience. But I'm still going back. That shows the way I feel about the place. My wife writes that I can still have my job back again as soon as I get there.
5. *Would you prefer to live in the city or in the country?*
   I like to live out in the country districts. The place where we live now is a mile outside of Shreveport. It's a fine place for the boy out there.
6. *Do you like your present job? What is it?*
   I'm commercial manager of a radio station in Shreveport. I'm very fond of it.
   a. *Have you worked mostly at the same kind of job or different ones?*
      I was foreign correspondent of the United Press for quite a while. I was in the Argentine four months in 1927; I went back again in '31. I was a newspaper man and an interior decorator. My father's forte is rugs and decorations; and he wanted me to take that work up. So it took me those first years of work to find out what I wanted to do. A father shouldn't try to force his son into a particular kind of work. I'll not do that to mine. I was in newspaper work until 1935. Then I went into radio. I saw a marvelous future there. I still think it is.
   b. *Which kind have you liked best?*
      The most exciting was newspaper work. But the one from which I got the greatest remuneration is radio work. When you've got a wife and child you have to think of that. So this is the work I'd choose now.

c. *About how many jobs have you held during your life?*
Not so many. I can count them. Six or seven. I've never been fired, I've always resigned.

7. *If you had your choice, what kind of work would you like best?*
If I had a chance to do absolutely anything and didn't have to think about money, I'd want to be a newspaper man, a free lance, all over the world. You can usually land a job if you're any good.

8. *Have you been a member of any clubs or organizations or groups here or where you lived earlier? What kind?*
I was a member of a couple of forensic societies, and the A Club at the University of Alabama where I went. Then I was on the Panhellenic Council. I was a fraternity man.

9. *How long did you belong? Did you go to the meetings? Did you ever hold office?*
About 2½ years, while I was in college. I always had the gift for gab, like my mother. That's why I was in the forensic societies.

10. *Do you vote?*
Yes, thank God, I can still vote.

11. *Do you care much about politics?*
I get a great kick out of it. I took part in electing Roosevelt. In fact, I was on Roosevelt's train, when he made his tour. I was working on the Bridgeport paper then. But the paper was so Republican that I got out of it.

  a. *Do you think the country is being run right?*
  Yes. I think we've plenty of resources, too. The surface is just not scratched. As far as hydraulic power is concerned it's certainly that way. There's plenty of work to be done, and as long as people are occupied radicalism will be kept down. Idleness is the devil's work shop. When people are working and busy things go better and no trouble starts. It's better to do anything than to do nothing.

12. *Do you believe that rich people usually get their money unfairly?*
You can't divide wealth. There isn't such a thing. If you divided it up today and got an equal amount into all hands, there'd be the same thing there is now in just a little while. It'd all be back in a few hands. I don't think it's unfair. I do think there should be larger dividends, so that this much more division might occur. But the final result would be the same. . . . Europe will be in war before August is over. Hearst is being very unfair. I've been in Spain and in Morocco and Hearst's treatment of the whole subject seems crazy to me.

13. *Do you go to church? What church?*
Well, on Jewish New Year and the Day of Atonement and Yom Kippur I go to the Jewish temple. My wife goes with me. She's a Presbyterian. And on other Sundays I sing in the Presbyterian Sunday School. I read Lewis Brown's "This Believing World," and it set me thinking about this whole question of religion. I'd like to meet that man.

14. *Do you pray often?*
Yes, every night. Shall I say it for you? (Repeats long prayer.) You see, it's a real prayer, not just a Now I Lay Me. I never argue about religion. My wife is a very intelligent girl. It didn't matter to her whether I was a Jewish boy or a Mohammedan.

15. *Have you had a fair deal?*

  a. *At the time of your arrests and trials?*
  Everybody's been very kind to me. Although the law has been

broken in my case, I believe that mitigating circumstances were such that I should not have been kept in jail all this time. I was even in jail in Shreveport. I deserve everything I'm getting for being careless. I think this is doing me a lot of good. It's not unfair. But I've never been in anything like this before. I get tired playing bridge. I'll sleep in the day time and read at nights. In fact, I was playing bridge when you came. If I'd known you were coming I'd have shaved. But I get tired reading, and sometimes for hours, especially at nights, I'll just lie there and think, there in my bunk. Things I never thought of I remember. I can see what a darn fool I've been. I really think everybody before they're twenty-one ought to spend at least thirty days in jail, just to see what it's like just because you learn such a lot from it.

b. *During your probation period or in between arrests?*
(Omitted.)

c. *Before that time, in your early life?*
Too fair. I never had to ask for anything.

15. *How many close friends have you?*
Really intimate, that I can sit down and tell things to and know they'll be interested? Well, let's see: my wife, my father, and a woman about sixty-five years old. I've never confided in mother. I've always gone to Dad. I set my mother upon a pedestal, but I never talked to her about things.

17. *Could you trust them to help you out in a pinch, even when it would be hard for them?*
Oh, right on up.

a. *Would you do the same for them?*
Oh Lord, yes.

18. *Would you rather be alone or with other people?*
I'm rather moody that way. It all depends. If I've anything to read I want other people away. If my mind's unoccupied I'd like to be with other people.

a. *Which things do you prefer to do alone; which with other people?*
When I read and work I want to be alone. Other things I like to do with others. I like to play contract bridge, for instance. There's a man up in my tank who's awfully good. We play all the time.

19. *Are you in fact alone much? What proportion of the time?*
No, very little. I'm out and in all day long when I'm working.

20. *How old were you when you started school?*
Four. I started at the Sacred Heart Academy. I was the only boy.

a. *When you left?*
Eighteen and a half.

b. *What grade did you finish?*
Two and a half years college.

21. *Did you mind stopping?*
I don't know why I stopped. I had all A's except in Chemistry. There was no reason for stopping. I was a crazy boy. I seem to have been in a fog, wondering where I was going.

a. *Did any teacher ever pick on you?*
I don't recall any. But everybody must have had that experience at somebody's hands. Only one instance of it in my school career

stands out in my memory. I was kept off the Varsity football team, and I didn't think I deserved that.

b. Did other children like you?
Yes, I always got along.

c. If you had it to do over again would you go farther in school?
Yes, I would. I'd be a doctor. I'd get myself into a profession nobody could take away from me so long as I had my license to practice. I was always crazy about medicine anyway, anatomy, psychology and psychiatry, physiology, pharmaceutics, etc.

22. *What was your father's business?*
He was a merchandise manager with Kurges Phillips Company in Birmingham. They do millions of dollars worth of business a year, so it's no mean firm.

a. Was he very strict with you when you were a child?
I think he was too strict. I wouldn't be that strict with my boy.

b. Your mother?
My mother was severe, too. As far as verbal argument was concerned, my mother would take my part.

c. Did either whip or nag at you?
As far as my father was concerned, to the bathroom I'd go with the strap if I so much as spilled a glass of water. Maybe I deserved these lickings. I got plenty. Mother never laid a hand on me. But mother nagged.

d. Were you afraid of either?
No.

e. Are you like either of them?
Yes, my mother.

f. Are you glad of this?
In some respects; in some I'm not. I look like my mother, I've got the gift of gab like my mother, I probably have the tendency to exaggerate as she did.

g. What were the things you liked and disliked about your father?
I liked my father for his integrity. He'd lose his right arm before he'd do anything wrong. He'd always tell the truth. That I liked. I disliked his stubbornness. Once he said no, nothing could sway him. I've never been able to think of anything else I disliked.

h. What were the things you liked and disliked about your mother?
My mother always made a mountain out of a molehill. I didn't like this. She always told other people her troubles and seemed to be reaching out for sympathy. She'd play bridge at a party and next day everybody in town would know if one of us had a cold in the head. As far as my reputation is concerned, I think mother gave me my reputation. The chief of police wrote to the Jewish Welfare Agency that I was "wild". I'm not wild. That was just due to my mother's exaggerations and tendency to tell everything.

23. *Did either of them have it in for you?*
No. My mother always showed partiality for my younger brother. If we were going out in the evening she always gave him the car. I'd have to hire a taxi.

a. Did either spoil you?
Dad.

b. Did you think other children's fathers were nicer than yours?
Not fathers.

c. Mothers?
Only in that one respect, about my mother. I didn't see why my mother had to tell everything. Other people's mothers didn't. Mother always compared me with my cousin, Robert Boleman. He is a dermatologist now and a very successful one. She always referred to him as a model boy. He is a fine chap, just a wonderful chap. But she'd go around comparing us.

d. Did they pay very much attention to you?
No, except when I did something wrong.

e. Were they affectionate with you?
No. Daddy wanted to be. I'm very affectionate. I just crave affection. I like to be told when I've done something worth while, I like to be commended.

24. *Did you tell either of them everything about yourself or many of the things you were thinking?*
There are some things every boy holds back, I think. I never discussed the problems of sex with either of them, for instance. My parents never told me anything about sex. Not one thing. I learned what I knew from books or other boys. I never told my mother anything. I'd even fib to her to avoid telling her anything.

25. *Do you wish you had been more or less strictly raised?*
Well, as to actual corporal punishment I wouldn't care particularly whether that was different or not.

a. In what ways do you wish they had treated you differently?
I wish my folks had gone on different tangents in my unbringing. I wish they'd set me down and told me things instead of going away by themselves and coming back and giving me a whipping. Things would have been much better.

25. *Were your father and mother separated?*
No, no.

a. How old were you?
(Omitted.)

b. Did either remarry?
(Omitted.)

c. Did they get along well together?
They were very devoted. They still are. I haven't heard from them since I've been in here. They write my lawyer, but they haven't written me directly.

27. *Did they generally have the same kind of ideas or different?*
Well when people have lived together for thirty years, if one of them has any intelligence he'll learn to make their ideas the same. There's no other way to get along together.

a. Whose did you like best?
My father's. His reasoning was always the surer.

28. *In what ways do you want your child's training to be like yours or different?*
That's a question. I never want my boy to be forced to tell me a lie. I want him to know he can always come to me no matter what he's done and tell me things with absolute confidence. That was never done

for me. If I told my father things I was as likely to get a whipping as not for what I'd done. My son feels free now to come to me with anything. When I used to go to my father and want to go to a movie and ask him for some money, my father used to throw a dollar at me. Now with my boy I'd ask how much it was, how much it would take for car fare, and so on. I wouldn't just give him a lump of money. I'd give him what he needed. I never was taught to have a savings account either. My boy has one now and he puts his bright shiny pieces of money into it. Frankly, until recently I've never known the value of money.

29. *How many older brothers or sisters have you?*
None, just one younger brother. He's twenty-five now.

   a. Younger?
   (Omitted.)

   b. Have they ever had it in for you?
   Well, there's always been a great deal of jealousy between my brother and myself. His opinions at home bore more weight than mine. He even shot at me once with his BB gun.

   c. Did you get along well together?
   We've never been very close. He's a swell fellow, though. I'm crazy about my brother. But I've never been close to him. He's making 10,000 a year and he's only twenty-five. But ask him to spell psychology, and he couldn't. You know what I mean? He's just not interested in that kind of thing. But he's a fine fellow.

30. *Do you and your wife get along well together?*
Oh, swell.

   a. About what kind of things do you agree and differ?
   The only disagreement is on bringing up the child. Just little things. I like to bring him up along lines a little ahead of the social structure of my wife's circle. She graduated from Sophie Newcomb college. She's a bright girl. She was working when we married.

31. *Have you children?*
One boy, four. He looks like his Dad. He's beginning to develop lots of traits I didn't have. He's not picayunish about his food, for one thing. He has more respect for his parents than I used to have. I'm afraid we'll have to send him to school in the fall. He's read simply everything.

   a. How old are they?
   (Omitted.)

   b. Do they resemble you?
   (Omitted.)

(Southern accent. Reads letter from wife, all about the child. Wife has job now, in Ready-to-wear store. He believes she's pregnant. Why?)

She's usually vibrant with energy. She must be pregnant, because it's not like her to be tired otherwise. She was that way when our first was born. I'm just reading between the lines. Nobody has told me. But she has too much vitality to stop at anything usually, she'll go all day and come home and want to go out and dance all night. My mother is going through the change of life. Just to sit down and write me in here would upset her. She just can't stand to call up the picture of me in here that she'd have if she wrote me.

Ratings on Interview.

1.	Dissatisfaction with community (That is, *this* community)	3
2.	Dissatisfaction with work	1
3.	Social behavior: avoidance of group activities	2
4.	Social behavior: avoidance of individual contacts	2
5.	Social preferences: insurgency	1.5
6.	Social preferences: desire for solitude	3
7.	Chip on shoulder	1.5
8.	Antagonism toward authority	2
9.	Reserve with father	2
10.	Antagonism toward father	1
11.	Reserve with mother	5
12.	Antagonism toward mother	2
13.	Dissatisfaction with marital experience	1
14.	Dissatisfaction with children	1
15.	Lack of integration with ideal	4

APPENDIX E

DESCRIPTION OF RATING USED FOR INTERVIEW MATERIAL

(In parentheses, questions of interview on which judgment was based.)

1. *Dissatisfaction with community.* (2, 4, 5.)

1	2	3	4	5
Enthusiastic about L.A.; booster; loves to live here.	Likes this region; has some feeling of belonging here.	Indifferent to community; not strongly identified with it, but no antagonism	Dislikes L.A.; would prefer to live in country or some other place.	Strongly dislikes L.A.; would like to live almost anywhere else.

2. *Dissatisfaction with work or with work experiences.* (Either present job or work experiences in past.) (6a, 7.)

1	2	3	4	5
Shows marked enthusiasm about present occupation or about work experiences in past.	Fairly content with present work, or with work in past; would like to make some slight change.	Average satisfaction with job or experiences in work; no enthusiasm but no discontent.	Discontented with present job, but glad to have it; would prefer many other kinds of work.	Strongly dislikes present job; *or*, has never had a job he liked.

3. *Social behavior: avoidance of group activities.* (8, 9, 10, 13.)

1	2	3	4	5
Belongs to many organizations; active participant in political and group affairs.	Considerable group-activity; belongs to 2 or 3 organizations, votes, etc.	Slight present interest in organized activities.	Group affiliations at one time, but little activity and no present interest.	No group affiliations in present or past; seems to have avoided them.

4. *Social behavior: avoidance of individual contacts.* (16, 17, 19.)

1	2	3	4	5
Always with other people; almost never alone.	With other people a good deal of time.	With other people average amount.	Spends a good deal of time alone.	Spends a great deal of time in solitude; little association with people.

5. *Social preferences: insurgency.* (11, 12.)

1	2	3	4	5
Thoroughly approving of present regime.	Rather approving.	Indifferent to way things are run.	Somewhat critical and disapproving.	Marked disapproval of present regime with explicit criticisms.

6. *Social preferences: desire for solitude.* (18.)

1	2	3	4	5
Wants to be constantly with people; craves companionship; avoids solitude.	Somewhat prefers to be with other people rather than alone.	Has no particular feeling either for or against being with people.	Rather prefers not to be with people but alone.	Strong-distaste for being with people.

7. *"Chip on shoulder".* (15, 21, 23, 29.)

1	2	3	4	5
No tendency whatever to feel resentment or persecution or being "ill done by".	Very slight tendency in this direction.	Some bitterness and hostility toward people responsible for his life.	Rather strong bitterness and hostility.	Very strong persecutory feelings; everyone out to get him.

8. *Antagonism toward authority.* (11, 12, 15, 22, 25.)

1	2	3	4	5
No tendency whatever to combat, resent, or criticize authority, either personalized (parents, police, probation officers, teachers, etc.) or in form of discipline.	Very slight tendency toward critical attitude, but accepts authority philosophically.	Some criticism and lack of sympathy with those in authority or with disciplinary techniques.	Definitely confirmed critical attitude.	Strong antagonism toward authority.

9. *Reserve with father.* (22, 24, 27.)

1	2	3	4	5
Very great intimacy with father; told him everything; very close relationship.	Considerable intimacy.	Average closeness; no tendency to confide, but no strain or reserve.	Some distance and reserve in relationship.	Very great reserve; told him nothing; felt no freedom or closeness.

10. *Antagonism toward father.* (22-27.)

1	2	3	4	5
Very fond of father; speaks of him with marked affection.	Rather fond of him.	Indifferent.	Inclined to be critical and unsympathetic.	Marked hostility.

11. *Reserve with mother.* (22, 24, 27.)

1	2	3	4	5
Very great intimacy with mother; told her everything; very close relationship.	Considerable intimacy.	Average closeness; no tendency to confide, but no strain or reserve.	Some distance and reserve in relationship.	Very great reserve; told her nothing; felt no freedom or closeness.

12. *Antagonism toward mother.* (22-27.)

1	2	3	4	5
Very fond of mother; speaks of her with marked affection.	Rather fond of her.	Indifferent.	Inclined to be critical and unsympathetic.	Marked hostility.

13. *Dissatisfaction with marital experiences.* (30.)

1	2	3	4	5
Marked devotion and harmony.	More sympathy and understanding than average.	Average ease and success in adjustment.	Some strain and marital maladjustment.	Complete lack of harmony and sympathy.

14. *Dissatisfaction with children.* (28, 31.)

1	2	3	4	5
Very enthusiastic about children; devoted to them.	Takes lively pride and pleasure in them.	Likes children; gets along well with them.	Tolerates them without enthusiasm.	Resents and dislikes children.

15. *Lack of integration with ideal.* (28, 25a and b.)

1	2	3	4	5
Wants for child plan of training and life practically identical with his own.	No great gaps between his desires for child and his own upbringing.	Wants to retain some elements of his own training and eliminate others.	Wants considerable changes in child's upbringing when comparing it with own.	Wants child's training to be practically opposite of own in all particulars.

APPENDIX F

ITEMS IN SELF-ORDINARY-IDEAL TEST

A	Self	Son	Most Men
1. Be one of the richest men in the U. S.			
2. Lead a roving life (of adventure).			
3. Be a powerful political boss			
4. Be a popular hero			
5. Work on a ranch or farm			
6. Devote your life to helping others			
7. Have a big family			
8. Have people let you alone			
9. Be a social reformer			
10. Have a wife who depends on you for everything			
11. Be a highly skilled worker			
12. Be the kind of person everybody comes to for advice			
13. Be responsible for the welfare of a lot of people			
14. Be able to fix a machine so that it will work			
B			
1. Go off alone to the country			
2. Spend an evening with one or two friends			
3. Take out a girl from a show			
4. Listen to an educational lecture			

5. Go on a party
6. Go to a Socialist meeting
7. Sit and think
8. Read
9. Go to church
10. See a good fight
11. Play a really good joke on somebody
12. Play cards with a good crowd
13. Work puzzles by yourself
14. Go hiking alone

APPENDIX G

TABLE 20

MEANS AND STANDARD DEVIATIONS OF DISTRIBUTIONS OF ODD AND EVEN ITEMS IN SELF-ORDINARY-IDEAL TEST

Difference	Odd items		Even items		Differences		$\frac{Diff.}{\sigma_{diff.}}$	
scores	Mean	σ	Mean	σ	Means	σ	Means	σ
1. Self-ideal differences	5.73	3.41	5.27	3.18	0.46	0.23	1.53	0.85
2. Self-average differences	10.80	4.52	8.16	4.29	2.64	0.23	6.77	0.66
3. Ideal-average differences	8.50	4.26	8.71	3.93	0.21	0.33	0.57	1.00

It will be seen from the above that there is no significant difference between the means and the standard deviations of the odd and even items except in the case of the means of the Self-Average difference scores. Hence the application of the Spearman-Brown formula for calculating the reliability of the whole test is appropriate. In the case of the Self-Average difference scores, the estimate of reliability is probably too low, because the large difference between the means indicates that this is probably not the best estimate of the reliability coefficient.

APPENDIX H

SUPERFICIAL RATINGS

Based on direct observation during interview

1. *Masculinity*

1	2	3	4	5
Sissy	Rather effeminate	Average	Quite masculine	Markedly masculine

2. *Physique*

1	2	3	4	5
Very frail and underweight	Rather frail	Average	Sturdy	Strikingly robust

3. *Speech: clarity*

1	2	3	4	5
Very confused mode of speech; meanings obscure	Poor use of words	Average	Good and rather accurate choice of words	Excellent vocabulary; precise

4. *Speech: articulateness*

Very inarticulate; silent; difficulty in eliciting responses	Laconic; brief replies	Average amount of speech	Volunteers information often	Very talkative

5. *Neatness*

1	2	3	4	5
Unkempt; old, shabby clothes	Careless, disorderly	Neat and clean	Rather painstaking about dress	Fastidious

6. *Courtesy*

1	2	3	4	5
Aggressively rude	Sometimes discourteous	Good mannered	Courteous	Elegant

7. *Alertness*

1	2	3	4	5
Continually absorbed or preoccupied	Frequently abstracted; sluggish	Good contact with present situation	Wide-awake	Keenly alive or aware

8. *Interest* (in interview)

1	2	3	4	5
Very unconcerned, indifferent, lacking in interest	Rarely interested	Usual, average curiosity	Interest easily aroused	Wide and lively spontaneous interest

9. *Frankness*

1	2	3	4	5
Marked sense of privacy; resistance, evasion	Seldom speaks openly	Frank on most topics (or on some and not others)	Few topics evaded	Very frank; open

10. *Friendliness*

1	2	3	4	5
Marked hostility during interview	More resistive and uncooperative than average	Normally friendly	Quite friendly; outgoing; enjoys interview	Eager to please; tries to elicit approval

11. *Freedom from suspicion*

1	2	3	4	5
Very distrustful	Needs reassurance	Normally trustful	Somewhat more trustful than average	Extreme trustfulness

12. *Freedom from tension*

1	2	3	4	5
Extremely tense; marked physiological signs of tension	More tense than average	Normal tension	Fairly relaxed	Very relaxed

13. *Freedom from restlessness*

1	2	3	4	5
Extreme over-activity and restlessness; no repose	Above average in activity; fidgets; moves a good deal	Normal activity	Less active than normal; movements sluggish	Extreme inactivity; inert

14. *Poise*

1	2	3	4	5
Goes to pieces; very lacking in self-possession	Easily upset	Average poise	Usually self-controlled	Very well-poised and calm

15. *Ease of social contacts*

1	2	3	4	5
Exceptionally shy; obvious acute discomfort and withdrawal from people	Easily embarrassed; slight discomfort in presence of strangers	Normally at ease	Somewhat stimulated by presence of people	Exceptionally easy and quick social contacts

16. *Cheerfulness*

1	2	3	4	5
Very sombre or sad; difficult to elicit smile or laugh	Less happy than average; pessimistic	Neither outstandingly sombre or gay	More cheerful and optimistic than average; light-hearted	Constant gayety and over-optimism

17. *Emotional expressiveness*

1	2	3	4	5
Extremely reserved; emotionally inhibited	More reserved than average; avoids emotional expression	Normally expressive	More expressive than average; spontaneous in expression of anger, joy, desires, etc.	Extreme emotional expressiveness; much less inhibited than average

APPENDIX I

FORM FOR RECORDING SOCIOLOGICAL DATA

File No...........
1. True Name......................... Alias.......................
2. Charged with crime of................ Convicted of................
3. Plea.............. Court.................... Jury................
4. Race............................ Nationality....................
5. Status of parents...
6. Father's occupation ....
7. Age........ Birthdate........ Birthplace........ Reared by........
8. Came to U. S......... To California........ To L. A. County........
9. School grade finished.......................... Age..........
10. Use of intoxicants..................... Narcotics................
11. Occupation.................. Employment Record..................
12. Present employer.................. Last employer.................
13. When terminated.......... Why............ Length of............
14. Married............ 1st........... 2nd........... 3rd............
15. Divorced......................... Separated.....................
16. Children.................. Boys............... Girls.............
17. Dependents supported by defendant ....
18. Previous arrests...
19. Co-defendants.................... Disposition....................
20. Employment age began...
21. Social Agencies...
22. Home conditions (A) Well to do.... (B) Moderate..... (C) Poor....
(D) Dependent....... (E) Renter....... (F) Home
Owner.... (G) Buying House.... (H) Roomer....
(I) Transient......
23. How many and who compose family.......... Dependents...........
24. Type of house (A) Single...... (B) Double...... (C) Apt.........
(D) Hotel..... (E) Room...... (F) Transient......
(G) Other...... (H) Appearance........
25. Social activities.......... Yes......... No......... What.........
26. Recreation clubs...................... Assn........................
27. Military record...... Army.... Time ...... Navy.... Time......
28. Financial Mo. earnings...... Other income Yes......
No...... What ....
Own home Yes...... Address.................................
No.......
Assessed value............ Tax............ Mtg..............

Other real estate Yes......
No.......
29. Auto............. Description............... License No...........
Owned......................... Balance due..................

APPENDIX J

COMPARISON WITH LARGE UNSELECTED GROUP

TABLE 21
EDUCATIONAL STATUS

Grade finished	Unselected group (N. 2213) Per cent	Repeaters (N. 19) Per cent	First offenders (N. 26) Per cent
6th or less	0.3	5.3	0.0
7th	1.1	10.5	0.0
8th	3.7	15.8	11.6
9th	3.9	10.5	3.8
10th	6.4	21.0	27.0
11th	10.5	15.8	23.1
12th	34.1	21.0	34.6
More than 12	38.7	0.0	0.0
Unaccounted for	1.3	0.0	0.0
Still in school, full or part time	14.6	0.0	0.0
Average schooling (grade)	12.3	9.6	10.6

TABLE 22
MARITAL STATUS

	Unselected group Per cent	Repeaters Per cent	First offenders Per cent
Married	12.9	15.8	19.2
Separated or divorced	0.6	10.5	7.7

TABLE 23
DEPENDENTS

	Unselected group Per cent	Repeaters Per cent	First offenders Per cent
Full dependents (1 or more)	19.7	5.3	3.8
Partial (1 or more)	16.4	10.5	15.4
None	63.9	84.2	80.8

TABLE 24

EMPLOYMENT STATUS

	Unselected group Per cent	Repeaters Per cent	First offenders Per cent
Gainfully employed, full or part time	54.4	26.3	30.8
Unemployed and out of school	23.7	73.7	69.2

TABLE 25

WEEKLY PAY

Pay	Unselected group Per cent	Repeaters Per cent	First offenders Per cent
No pay	38.3	0.0	0.0
$ 0 - 4	1.6	5.3	0.0
$ 5 - 9	6.5	5.3	3.8
$10 - 14	9.4	26.3	19.2
$15 - 19	19.7	26.3	23.1
$20 - 24	13.0	26.3	34.6
$25 - 34	6.6	5.3	11.6
$35 - 44	1.6	0.0	3.8
$45 - 54	0.4	0.0	3.8
$55 and above	0.2	5.3	0.0
Unknown	2.7	0.0	0.0
	100.0	100.1	99.9

TABLE 26
Types of Occupation: Their Own and Fathers'

Kind of occupation	Unselected Per cent Own		Repeaters Per cent Own		First offenders Per cent Own	
		Father's		Father's		Father's
Semiprofessional worker	3.2	5.0	10.5	15.8	7.7	7.7
Managerial worker	0.3	1.3	0.0	0.0	0.0	3.8
Supervisory worker	0.5	1.9	0.0	10.5	0.0	3.8
Commercial worker	7.2	8.8	5.3	0.0	3.8	3.8
Clerical worker	6.6	6.2	21.0	10.5	11.6	0.0
Building trades	2.4	5.9	10.5	15.8	0.0	0.0
Machine or related trades	4.0	4.6	0.0	21.0	19.2	27.0
Printing trades	1.3	1.5	0.0	0.0	0.0	3.8
Transportation or communication (skilled)	1.1	1.5	5.3	0.0	0.0	0.0
Small farm owner or renter	0.0	0.4	5.3	5.3	0.0	0.0
Manufacturing, mechanical, or production work	9.7	10.3	0.0	5.3	7.7	0.0
Transportation or communication (semiskilled)	1.1	3.5	0.0	0.0	15.4	0.0
Semiskilled owner or proprietor	0.6	3.1	0.0	0.0	0.0	3.8
Personal service	3.8	6.0	5.3	0.0	7.7	11.6
Farm share cropper	0.0	0.1	0.0	0.0	0.0	15.4
Manual laborer (non-farm)	4.5	3.9	36.8	10.5	27.0	7.7
Unknown	1.9	2.6	0.0	5.3	0.0	11.6
	48.2*	66.6*	100.0	100.0	100.1	100.0

*Only those occupations are presented for the unselected group which are represented also by some members of our groups or their fathers.

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University of Edinburgh

E. L. Thorndike
Teachers College, Columbia University

C. J. Warden
Columbia University

John B. Watson
New York City

Helen Thompson Woolley
Teachers College, Columbia University

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A COMPARATIVE STUDY BY MEANS OF THE RORSCHACH METHOD OF PERSONALITY DEVELOPMENT IN TWENTY PAIRS OF IDENTICAL TWINS*

Submitted in partial fulfillment of the requirements for the degree of Doctor
of Philosophy in the Faculty of Philosophy, Columbia University
1937

EVELYN TROUP

Teachers College, Columbia University

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EVELYN TROUP

316 SUMMER STREET
BUFFALO, NEW YORK

I. THE FIELD OF RESEARCH AND THE PROBLEM

SELECTION OF THE PROBLEM

The growth of interest in the study of child development and guidance has made students in this field more keenly aware of the importance of environmental factors, both obvious and subtle, in the developing personalities of children. Clinicians are constantly observing also the amazing temperamental differences in members of a family who share an apparently similar general environment. The amount of research which has been and is constantly being produced on many phases of the nature-nurture problem is evidence of the recognized need of a better understanding of the potency of these complex forces in the molding and development of individuals. This investigation therefore was planned to study still further environmental influences on personality development in children by studying individuals whose inheritance is as similar as possible.

The desirability of studying monozygotic twins as an approach to the problem of the effect of environmental influences on the developing of personality is obvious, since only by using such subjects can variability in the genotype be avoided. From increased knowledge of genetics, it is evident that while the heredity of monovular twins is never identical, still there is more likeness than in any other pair of organisms, the degree of similarity between them being greater than ordinarily found among siblings. Thus it may be assumed that hereditary factors as causes of differences are reduced to a minimum and, therefore, the influence of environment may be studied more satisfactorily. While studies of identical twins reared apart and foster siblings reared together in the same foster homes perhaps offer the most fruitful approaches to this problem, data on identical twins reared together contribute important supplementary evidence on the nature-nurture question. Here the experimenter is not faced with the difficulties inherent in the first two types of investigation. In the interpretation of the data, however, one fact must be remembered: that the parts played by heredity and environment in the case of these twins are inextricable, their generic similarity producing a social situation peculiar to them and in turn affecting personality development in a manner different from that of dizygotic twins or siblings. These data, then, should furnish additional information, especially if subjected to quantitative analysis, to confirm or disprove the idea of a high degree of similarity in the direction of personality development of monovular twins.

There is another field of investigation which may be served by these data--the development of more effective methods of personality study. The relatively insignificant number of comparative studies of personality development as compared with studies of intellectual resemblances of twins may perhaps be accounted for by the fundamental difficulties inherent in the quantitative approach to the study of personality, and there has been a rather widespread dissatisfaction with the statistical atomistic approach. Allport (1), Vernon (3), Wells (77), and others have called attention to the ineffectiveness of the quantitative type of personality test used so widely in this country in throwing light on the unit personality and have indicated the need for the inclusion, also, of the qualitative approach to personality study which is more characteristic of European research.

ORIGINAL PLAN

In a preliminary investigation two types of approach to the study of temperamental differences were used. An analysis was made of the personality responses of 20 pairs of twins on half a dozen or more of the standardized measures. With the exception of the Rorschach and samples of handwriting, the tests were of the objective pencil and paper variety. A consideration of the data indicated certain fundamental dissatisfactions with the objective type of test: differences due to the age factor had been disregarded in the building up of norms; children lacked interest in the necessary procedure; no opportunity was afforded for observation of the children. In short, the so-called objective tests and questionnaires measuring isolated traits were relatively ineffective in revealing by means of their quantitative scores any understanding of the inner core of the subject's personality.

CHOICE OF THE INSTRUMENT

In the attempt to compare similarities and differences in the unitary personality constellations of the two members of a pair of twins, the experimenter was impressed strongly with the insight afforded into the personality make-up of children by means of the qualitative intensive analysis of the Rorschach technique.

This method of personality diagnosis is a type of free association test, in which 10 symmetrical ink blots (some in colors) are presented as stimuli and the subject is requested to tell what the blot suggests to him. Each response is then scored according to three classifications: (*a*) mode of apperception which includes the subject's response to the blot as a whole, to details, etc.; (*b*) quality of the response, i.e., color, movement, or form; (*c*) content of the response and its originality or commonality. The responses are recorded in a psychogramm which furnishes a schematic picture of the total personality make-up of the subject. Discussing these categories, Hertz says:

> Rorschach claimed that his test factors pointed to certain psychological processes and that definite symptomatic values could be credited according to their frequency, sequence, and reciprocal relationships. . . . The interpretation of the psychogramm depended not so much on the single test factors as upon the interrelated and combined factors. These latter reflected the intelligence and affectivity of the individual.
>
> Thus the Ink-blot Test could probe the total personality, revealing intellectual and non-intellectual traits and the reciprocal influence of one upon the other. Traits such as emotional stability and instability, adaptability, stereotypy, originality of thinking and of living, and others might be brought to light and studied in terms of the whole personality. Personality types (Erlebnistypen) might be differentiated as to the degree of introversive and extratensive traits present: the introversive, the extratensive, the ambiequal, the constricted, and the dilated. These types would have different characteristics in respect to affective qualities, intelligence, psychopathological correlates, imagery, mobility and expressive movements, interests and potential talents, occupational, and artistic tendencies and philosophy of life (32, p. 35).

The difference between the Rorschach test and the ordinary psychometric test should be pointed out to the reader unfamiliar with the Rorschach method of psychodiagnosis. Adequate norms and data on the reliability and validity of the instrument are lacking. Vernon points out that

> its aim is a qualitative one, namely, to aid the clinician in obtaining a schematized intuition into the total personality of his subject or patient. To apply statistical standards to each

> separate score is unsound since the significance of such a score is deemed to be dependent on the whole of the psychogramm; in other words the results of the test must be interpreted in the light of the "form quality" of the subject's personality. Hitherto, therefore, the validation of the test has been largely subjective, consisting of verbal comparisons between case studies of the subjects and diagnoses based on their ink-blot psychogramms. Its background lies in the typology of Jung, Jaensch, and Kretschmer rather than in the psychometry of Thorndike, Terman, and May. And its apparent failure to conform to the objective standards of present-day testing can only be comprehended in terms of this fundamental difference of background (72, p. 90).

Rorschach began investigation of the use of the ink-blot technique in clinical diagnosis in 1911. Vernon indicates that, with one exception, previous work with ink-blots carried on by investigators such as Binet, Dearborn, and Whipple, had little influence on the Rorschach method. The exception is Rorschach's "Erfassungstypus" or type of apperception which resembles the synthetic v. analytic or subjective v. objective types of response as described by Sharp, Whipple, Bartlett, and others (72, p. 90). There is a resemblance between the Rorschach method and both Jung's Free Association technique and Freud's dream analysis.

> In both tests spontaneous responses or associations are obtained, to ink-blot stimuli in one, to verbal stimuli in the other. Both, therefore, yield a kind of cross-sectional picture of the intellectual and affective life of the individual which cannot readily be expressed in terms of numerical scores, but is better treated clinically and qualitatively (72, p. 90).

The scoring of the response for originality in the Rorschach method is similar to that of the scoring for individuality in the Kent-Rosanoff free association technique. Vernon continues with the suggestion that

> possibly the ink-blot material is superior to verbal stimuli since responses to the latter are largely determined by verbal habits which can have but little diagnostic value. The ink-blots are comparatively free from conventional meanings, and the test can be applied equally well to persons of almost any age, and any nationality, irrespective of language factors (72, p. 90).

After experimenting with a large number of blots, Rorschach selected 10 test plates upon which he based his diagnosis of personality. Preliminary experimentation indicated that certain patterns of response were typical of various clinical types. In 1921 he published his monograph in which he presented a description of the test, the scoring method, and the results of the application of the test to 405 subjects, 117 of whom were normals and 288 of whom were mental patients. Although his death came soon after the publication of his results, some further developments based on Rorschach data have been reported by Oberholzer (62).

Since that time the test has been widely used in Europe as a diagnostic aid in psychiatry. Although less well known in this country, the method has been used with good results by Beck (5-9), Levy (42), Wells (77), Hertz (31-33), and others. Many clinicians who have used the test feel that in spite of the deficiencies of the method, the technique affords a combination of psychometry and observation and gives also a desirable balance of qualitative and quantitative approaches in the investigation of personality. Beck, who is probably the best known advocate of the Rorschach test in this country, writes that "with the exception of this one approach, there is no method which is ambitious and audacious enough to attempt the diagnosis, by the same instrument, of intellectual and affective forces of the individual and of their mutual interaction in producing overtly manifested behavior (5, p. 361).

FINAL PLAN ADOPTED

The data furnished by the Rorschach protocols suggested two fields of research: first, the investigation of similarities and dissimilarities in the tempo and direction of personality development in identical twins; and second, a methodological study of the reliability of the Rorschach technique. The first problem was attacked in two ways: (*a*) through the use of qualitative differential analyses of the protocols which are presented in Section V; (*b*) through quantitative study of the degree of similarity in the personalities of these twins as revealed by the Rorschach test and determined by means of the method of correct matchings.

The second problem involved a further analysis of these data by the matching method to meet the need for further investigation of the reliability of the Rorschach method.

The Rorschach test was chosen as the experimental instrument in this study because of its almost unique characteristic of affording a means of studying the still-developing integrated psycho-biological organization of the subject and how he functions in his environment.

The defects inherent in this test method have not been disregarded in this study. One has only to work with the instrument to discover its many shortcomings. Vernon, in his review of Rorschach research, discusses this point.

> The deficiencies of the Rorschach ink-blot method as a psychometric test have been amply demonstrated, in particular the uncertainties and subjectivity of its scoring, the lack of adequate norms, poor reliability, and almost complete absence of scientifically controlled validation. Yet I cannot agree that these deficiencies should lead to its rejection by investigators in the field of personality. They are inherent in the German approach to psycho-diagnosis, and I believe that the psychological tester would gain by attempting to incorporate something of this point of view in his over-objective and predominantly statistical outlook. Up to now attempts to develop direct tests of personality, analogous to tests of scholastic and industrial aptitudes, have not been particularly successful. And I am unable to call to mind any other test of personality or temperamental traits which tell me as much about my subjects in so short a time as does the Rorschach test. There is no a priori reason why the quantitative and qualitative viewpoints should be irreconcilable. . . . It would seem, therefore, worthwhile to divert some of the energy which is being expended on artificial tests of character and personality into the Rorschach method (74, p. 291).

Although the small number of cases limits the conclusiveness of the findings, it is hoped that this study will have two main results. It should contribute to the knowledge of the extent to which environmental factors modify the personality development of an individual, as seen in the degree of similarity in identical twins. It should also aid in the development of the Rorschach test itself as a more useful clinical tool for the study of the dynamic personality by determining more conclusively the reliability of the instrument.

II. A SUMMARY OF PREVIOUS INVESTIGATIONS

A. Recent Personality Studies of Twins

Summaries of the investigations of twins which have appeared in the literature in the past few years indicate that although there have been many researches dealing with the physical and intellectual resemblances between twins, until recently comparatively little attention has been paid by experimenters to similarities and differences in personality development. The major investigations of the intellectual resemblances of twins have been adequately summarized by Schwesinger (66). The important studies dealing with biological factors, mental traits, and abnormalities of identical and fraternal twins have been reported by Gesell (28). The literature with some reference to personality development has been reviewed by Rexroad (59) and Mason (46).

No attempt will be made here to present a survey of the rapidly increasing number of studies being carried on both in this country and in Europe as a result of the recognition of the value of the identical twin technique as an approach to an understanding of the nature-nurture problem. One of the most recent examples is the intensive study of the Dionne quintuplets by Blatz, *et al.* (11*a*). A bibliography of the literature dealing with temperamental differences in twins would include studies of two types: first, those involving the use of tests and other objective measures of personality and, second, those employing questionnaires, observations, interviews, and case histories; whose findings are expressed in quantitative terms and interpreted in the light of the method employed. In Table 1 selected representative investigations of both types are presented.

In some studies, the small number of cases and in others the inadequacy of the techniques employed limit the value of the findings. In the statistical studies measures of personality have been confined to a few pencil and paper tests whose validity has not yet been definitely established. In many of the qualitative studies the investigators have failed to produce conclusive evidence as to the monozygosity of the twins. These limitations force the reader to regard many of the conclusions as tentative.

Keeping in mind, then, the limited knowledge of the biological basis of twinning and the inadequacy of the measuring instruments, a survey of the studies revealed this important general conclusion:

TABLE 1
INVESTIGATIONS OF PERSONALITY DEVELOPMENT IN IDENTICAL AND FRATERNAL TWINS

Part 1. Studies Employing Personality Tests

Author	Date of study	Subjects	Number of pairs	Instruments used
Bakwin	1931	Identical twins reared together	23	Woodworth Mathews Psychoneurotic Inventory; Downey Will-Temperament Test
Brintle	1931	Quadruplets reared together	1	Terman Masculinity Femininity Test; Terman Interest Blank
Carter	1932	Identical and fraternal twins reared together	129	Strong Vocational Interest Blank
Carter	1933	Like and unlike-sexed twins reared together	133	Bernreuter Personality Inventory
Carter	1932	Identical twins reared together (Including one pair of Siamese twins)	4	Strong Vocational Interest Blank; Terman Masculinity Femininity Test; Watson Test of Fairmindedness; Downey Will-Temperament Test; Bernreuter Personality Inventory; Kent-Rosanoff Free Association Test
Carter	1934	Mature identical twins reared together for the first 20 years of life	1	Strong Vocational Interest Blank; Watson Test of Fairmindedness; A Modification of Voelker Overstatement Test
Holzinger	1929	Identical and like sexed fraternals reared together	50 52	Woodworth Mathews Psychoneurotic Inventory; Downey Will-Temperament Test
Koch	1927	Siamese twins	1	Pressey X-O Test; Downey Will-Temperament Test; Kent-Rosanoff Free Association Test
Müller	1925	Identical twins reared apart	1	Pressey X-O Test; Downey Will-Temperament Test; Kent-Rosanoff Free Association Test
Newman	1929 1930 1932 1933	Identical twins reared apart	10	Downey Will-Temperament Test; Pressey X-O Test; Kent-Rosanoff Free Association Test; Woodworth Mathews Psychoneurotic Inventory
Saudek	1934	Identical twins reared apart	1	Allport A-S Reaction Study; Bernreuter Personality Inventory; Pressey X-O Test; Neyman-Kohlstedt Test; Rorschach Ink-Blot Test

TABLE 1 (*continued*)

Part 2. Studies Employing Questionnaires, Interviews, Case Histories, Observations

Author	Date of study	Subjects	Number of pairs	Instruments used
Butts	1930	Female triplets reared together	1	Observation and case histories
v. Bracken	1934	Identical and fraternal twins reared together	27	Interview, free observation and experiments
Day	1932	Identical and fraternal twins reared together	80	Interviews with parents
Galton	1875	Like and unlike-sexed twins reared together	55	Questionnaire method
Gesell and Thompson	1929	Identical twins reared together	1	Observation
Lange	1930	Identical and fraternal twins reared together	30	Case histories
Lottig	1931	Identical and fraternal twins reared together	30	Observation
Mason	1934	Identical and fraternal twins reared together	4	Behavior rating chart
Newell	1930	Surviving pair of set of identical triplets reared together	1	Wickman Self Rating Chart
McGraw	1935	Identical twins reared together	1	Observation
White	1932	Identical and fraternal twins reared together	26	Questionnaires, observation and interview
Blatz	1937	Female identical quintuplets reared together	1	Observation

that the resemblance of identical and fraternal twins is very much greater in physical and intellectual traits than in character and temperament.

B. STUDIES OF IDENTICAL TWINS BY MEANS OF THE RORSCHACH TEST

Since the Rorschach technique has been chosen as the instrument for measuring personality differences of twins in this investigation the author will direct this discussion now to those studies employing the co-twin or similar techniques in the study of similarities and differences in personality development as shown by this test. There are several general surveys of the extensive theoretical and experimental literature. Vernon (72, 73, 74), Beck (9), and Hertz (31, 33) have contributed summaries of the literature and detailed descriptions of the administration, scoring, and interpretation of the responses.

1. *The Bleuler Studies.* The majority of the still insignificant number of studies of this nature have been carried on by European investigators. Bleuler has published several reports of his use of the Rorschach test in the study of the relative effects of heredity and environment. He investigated the psychogramms of 75 pairs of sisters and 610 pairs of non-sisters to determine the amount of resemblance (13). There was in no case more than three years' difference in the ages of the two members of any pair. He reports an average resemblance between pairs of sisters of 69.7 per cent on all categories and of 50 per cent in non-sibling pairs. The answers of brothers and sisters were identical four times as often as in the cases of non-brothers or sisters. He concludes that the number of similar answers given by the former could not be attributed to chance and therefore must be due to family influence.

Bleuler finds evidence for the fact that this similarity is due to heredity and not to environment in several different types of studies: investigations of groups of subjects in which each subject was judged to have a similar environment, investigations of brothers and sisters in orphanages, investigations of brothers and sisters who have grown up in different environments, and investigations of different types of twins (12). His results led him to conclude that

> the similarities between brothers and sisters as shown in the

> Rorschach records are mainly due to heredity. Although we still remain ignorant as to whether and to what extent heredity influences the groups of qualities selected for purposes of study, we have good reason to believe that its influence can be traced to the smallest reaction.

This investigator emphasizes the error of attempting to distinguish so sharply between the intellectual and emotional functions, every reaction being the result of both intellectual and affective readiness, neither of which occur in isolation.

O. v. Verschuer analyzed the same factors of the Rorschach protocols of 23 pairs of identical and the same number of fraternal twins. He concluded that the resemblances were greater in the monovular than in the biovular group (75, 76).

Koehn reports the use of some of the Rorschach blots in studying twins but gives no results, stating in a footnote that he did not consider this necessary since O. v. Verschuer and his collaborators in the Kaiser Wilhelm Institute for Anthropology in Berlin-Dahlem had used the test with good results in twins and heredity research (40).

Saudek studied a British pair of male identical twins, Ronald and Denis, 20 years of age, who had been reared in different homes since the age of one month. The Rorschach test was one of the several personality tests employed to study differences in personality make-up, the others being of a more objective nature. On this test no temperamental differences were observed (65).

2. *The Kerr Study.* Recently, Kerr studied temperamental differences in different types of twins and the reliability of the test (36). Her data do not substantiate the results of v. Verschuer that the amount of resemblance in identical twins was greater than in fraternals. The resemblances in whole responses, percentage of popular answers, kinesthetic responses, number of identical answers, and "Erlebnistypus" in 28 pairs of identical twins were not statistically greater than in 87 pairs of fraternal twins. Sex does not seem to influence the psychological type. The inter-twin correlations proved to be very low; the coefficient of correlation for the category of whole answers, 0.016±0.019; for popular answer percentage, 0.016±0.092. She concluded that the low order of similarity of identical twins as evidenced by the correlation coefficients and the small difference in the order of similarity for different types of twins

> suggests that the difference measured by the test is not exclusively due to genetic equipment but arises from the interaction of temperaments of individuals of similar genetic constitution. This seems to provide a roughly qualitative basis for the concept known as protest (36, p. 59).

The results confirm her hypothesis that "twins of either type have so much in common that they might tend to become unlike temperamentally as conscious or unconscious protest."

Vernon calls attention to the fact that the marked discrepancies in the results of various investigations can be easily understood if the reader considers the defects inherent in the Rorschach method as an instrument for large scale statistical research—for example, the variations in scoring due to the part played by the subjective judgment of the various investigators, inadequate reliability, rapport with the subject and the latter's mood at the moment (69).

C. THE RELIABILITY OF THE RORSCHACH TEST

There has been relatively little research on the reliability of this test. Several investigators—Behn-Eschenburg (10), Wertham and Bleuler (78), and Mira (50)—state that the instrument is reliable but present no statistical evidence to support their contention.

1. *The Vernon Study*. Using the split-half reliability method, Vernon tabulated the number of responses in each category in terms of percentage for three groups of subjects. The average correlations of the three groups on the various Rorschach categories ranged from 0.33 for "Form + Percentage" to 0.74 for "percentage of whole answers." The correlation for the total number of answers was 0.91 (73, p. 184).

He concluded that if an alternative form were available and given to the subjects, the average total number of responses on the second performance might be approximately the same, but the scores on the different categories might be very different since the average reliability was only 0.54. Vernon attributes the poor results in part to the subjectivity of the scoring and in part to the shortness of the test. He points out, also, that "the method of inter-correlating the scores on the separate categories is, admittedly, an unfair one, and it is particularly inappropriate because ordinary correlation methods always assume normal frequency distribution, while Meltzer has shown that none of the separate Rorschach scores conform to this type of distribution" (69, p. 3). His results do not confirm those of Rorschach in regard to the interrelation of the various categories. Vernon concludes that "if the test is to be regarded as a test at all or if it claims any objective validity it must in the future be modified in such a way that the reliabilities of the chief categories of response may achieve a level of at least 0.70 to 0.80" (73, p. 184).

In the study by Kerr, referred to previously, a group of 50 children were retested after a twelve-month period. This experimenter reports correlations ranging from .001±0.13 to 0.74±0.06 on the various categories (36). These data confirm those of Vernon showing that the results of the second performance may be very different from those obtained on the initial test. The test appears to be reliable for "banal percentage" and the number of "whole answers" and fairly so for "animal percentage" and "kinesthetic responses." Kerr suggests that these criteria (with the exception of banal percentage) may "measure mood or attitude and not temperament" (36, p. 58).

Hertz, on the other hand, reports coefficients of reliability ranging from .6 to .9 based on the corrected split-half method and attributes these to improved standardization of procedure and scoring. Her data confirm some of the interrelationships between the categories claimed by Rorschach (31). Vernon, whose results do not substantiate those of Hertz, suggests that Hertz's improved standardization of procedure may not be wholly responsible for these larger correlations. The greater heterogeneity of her group and her use of odd and even series, as opposed to his use of equivalent series, might be responsible for the divergent results.

With the exception of the results of Hertz, evidence seems to indicate that the reliability of the test has not been established.

D. Influence of Age on the Rorschach Scores

In view of the fact that the influences of age on the Rorschach scores must be considered in the interpretations of the data in this study, a brief summary of the experimental literature on this phase of the method is presented.

Several sets of norms for children between the ages of 10 and 16 have been published. A presentation of these data may be seen in the two reviews of Rorschach research by Vernon (69, 72-74). This writer points out the difficulty of comparing the results of studies of children with those of adults because of the lack of figures for the latter group. He concludes that

> on the whole children seem to give a smaller proportion of whole responses, a lower F + % and a higher animal per cent. Undoubtedly the number of movement responses and to a lesser extent the sum of color responses is lower in children than in adults. Rorschach states that children are, in general, ambiequal in "Erlebnistypus"; all the evidence points to their being mainly coartative with a slight inclination to extratension (73, p. 108).

Behn-Eschenburg studied a group of 209 Zurich school children between the ages of 13 and 15. He points out an increase in the number of whole responses and in ambiequality (72) and a decrease in animal percentage and small details (*Dd*) at the age of 14 over that of 13 and 15, but the reliabilities of those differences are not substantiated (10).

Löepfe's norms, which are based on the study of 120 boys between the ages of 10 and 13 who had been divided into three groups on the basis of their school age-grade, show no reliable change with age. However, there is an increase in "*form* +" percentage and the number of very small details, and a marked decrease in color reactions with age and a coartative trend in the older boys (43).

Loosli-Usteri (44) tested 63 boys, ages 10 to 12, 21 boys in each age group. Her results do not confirm those of Löepfe. Her data indicate that the number of whole responses increase, and the number of first grade details and popular percentage decrease with an increase in age. She "even considers ambiequality or introversiveness to be abnormal in children," since among her one hundred and forty-eight subjects only orphans and problem cases gave appreciable numbers of movement responses (73, p. 198).

Mira (50) studied 112 children, ages 14 to 16, and claims results which confirm those of the first two experimenters.

Meltzer, in his study of 64 American children who stuttered, states that extratensiveness increases with age, but his results do not confirm this conclusion but indicate rather the opposite trend (49).

Kerr tested 418 normal English children from seven to sixteen years of age, and her results show a decrease in extratensiveness with increase in age as well as an increase in whole, movement and anatomical responses and animal percentage (10 to 16 years of age) (36).

Dubitscher reports a marked decrease in extratensiveness between the ages of 10 and 11, and an increase in constriction and stereotypy; between 11 and 12, evidence of increased impressionability and inner activity, the development of greater combinatorial ability and evidence of some dilation; between 11 and 13, a continuation of all these developments and in addition an increase in originality and phantasy but little contact with surrounding and evidence of conscious opposition; from 13 to 14, a decrease in phantasy and lability but still labile and impulsive emotionally with an inclination to introversiveness. However, the number of subjects in his study is too small to furnish reliable age group differences (25).

III. CRITERIA UPON WHICH THE CHOICE OF THE IDENTICAL TWINS WAS BASED

Since the study was to be of an intensive qualitative nature with results based upon a relatively small number of cases, the reliability of the diagnosis of homozygosity seemed to be of utmost importance After an extensive examination of the literature, it appeared that in the majority of studies using the co-twin technique inadequate data on this point were presented. Since there is no way by which the monozygosity of like-sexed twins can be determined absolutely and no short cut method to any satisfactory diagnosis, those criteria were adopted which were based upon quantitative observations and which would enable other workers to know the bases upon which the choice of the pairs had been determined.

The diagnosis of monozygosity in the majority of studies has been based upon the summation of evidence from a number of physical features such as general appearance, finger and palm prints, hair, eye and skin color, etc., as advocated by Newman (56, 57), Dahlberg (23), Kaomi (35), and others. Here, however, it seemed far more satisfactory to adopt some technique based on quantitative measurement, the data of which would permit the determination of the chances of the members of a pair being dizygotic rather than monozygotic. After a survey of the available resources, the general technique developed by D. Cecil Rife (60) and suggested by M. L. Newman[1] seemed applicable.

This diagnostic formula consists of four qualitative traits—blood groups, *M-N* agglutinogen reaction, presence or absence of hair-between the first and second joints of the fingers, ability to taste phenyl-thio-carbamide and four quantitative traits—stature, iris pigmentation, intelligence quotient, ridge count of finger patterns. This was modified where necessary to allow for limitations in this set-up. Rife points out that the manner of inheritance of the four qualitative traits has been demonstrated (60). "The four blood groups, *A, B, AB,* and *O,* behave as triple allemorphs, both *A* and *B* being dominant to *O*, but both *A* and *B* manifesting themselves when present in the same individual (60, p. 340). Agglutinogen *M* and *N* are also allemorphs, one or both of which manifest themselves when present in an individual. The great disadvantage in the use of the qualitative traits lies in the fact that they are worthless if no relatives of the twins are available for comparison. In the case of two pairs of orphan twins this situation existed. In a rather large number of cases it was impossible to secure the coöperation of parents and siblings, and the investigator was unwilling to jeopardize the rapport already secured with the families by attempting to persuade some of them to submit to such tests.[2]

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[1] This information was sent to the writer by Dr. Newman in a personal letter.

The presence of hair on the dorsum of the mid-digital region was determined by means of a magnifying glass. The number and size are unimportant. It is known that the presence of such hair is dominant to its absence, apparently due to a simple pair of unit factors. The same is true in the case of phenyl-thio-carbamide taste test. The P.T.C. treated paper, secured from the American Genetic Association, was used (11).

It was possible to compare the twins with the parents on the last two traits—presence or absence of hair between the first and second joints of the fingers and ability to taste phenyl-thio-carbamide—and determine the probabilities of these twins being as similar, if dizygotic. An added advantage was that errors of sampling and measurement were avoided in these predictions.

The application of the quantitative traits was more simple to carry out, since these, although suffering from the disadvantage of errors of sampling and measurement, can be used without comparison with relatives. Here the intra-pair differences in respect to iris pigmentation, *IQ*, ridge count of finger patterns, and stature were obtained. In the case of the intra-pair differences in *IQ* the predictions were based on Merriam's findings (Binet) on 228 pairs of siblings (60). All the *IQ*'s have been computed by the writer so that the quantitative intra-pair differences were based on the results of a consistent testing procedure.

Using the Beebe Binocular Loupe, iris pigmentation was determined. Because of individual variation in color perception, all observations were made by the investigator. Several cases were checked by an ophthalmologist to determine whether any striking

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[2] Dr. Rife informed the writer that he would not advocate any traits being substituted for the blood groups but felt that the ones at the disposal of the writer were sufficient to determine identity; and the omission of the blood tests would not affect the validity of the formula.

TABLE 2
DATA ON MONOZYGOSITY OF TWENTY PAIRS OF IDENTICAL TWINS

Pair number		Qualitative traits			Quantitative traits			
		Taste for P.T.C.	Hair-on middle segment of finger	Pigmentation of iris	Total ridge count values	Differences in *IQ*	Differences in stature in inches	Chances that twins are monozygotic
I	A	T	P	E-O	86	6	.5	.999
	B	T	P	E-O	79			
	Mother	T	P					
	Brother	T	P					
II	C	T	P	E-O	100	0	0	.999
	D	T	P	E-O	107			
	Mother	T	P					
	Father	T	P					
III	E	T	P	E-O	87	1	1	.999
	F	T	P	E-O	87			
	Mother	T	P					
	No other member							
IV	G	T	A	E-O	158	4	2	.999
	H	T	A	E-O	157			
	Mother	T	P					
	No other member							
V	I	T	P	E-O	98	11	0	.999
	J	T	P	E-O	103			
	Mother	T	A					
	No other member							
VI	K	T	P	E-O	98	2	3	.999
	L	T	P	E-O	115			
	Mother	T	A					
	Father	T	A					
VII	M	N	A	E-O	88	0	0	.999
	N	N	A	E-O	88			
	Mother	T	A					
	Father	T	A					

TABLE 2 (*continued*)

		Qualitative traits			Quantitative traits			
Pair number		Taste for P.T.C.	Hair-on middle segment of finger	Pigmentation of iris	Total ridge count values	Differences in IQ	Differences in stature in inches	Chances that twins are monozygotic
VIII	O	T	P	E-O	33	6	1.5	.999
	P	T	P	E-O	32			
	Mother	T	P					
	Father	T	P					
IX	Q	T	P	E-O	60	1	1	.999
	R	T	P	E-O	64			
	Mother	T	P					
	Father	T	P					
X	S	T	P	E-O	26	0	.5	.999
	T	T	P	E-O	29			
	Mother	T	P					
	Father	T	P					
XI	A	T	A	E-O	61	0	0	.999
	B	T	A	E-O	57			
	Mother	T	A					
	Brother	T	A					
XII	C	T	P	E-O	102	7	.5	.999
	D	T	P	E-O	94			
	Mother	T	P					
	Father	T	P					
XIII	E	T	P	E-O	41	4	.5	.999
	F	T	P	E-O	39			
	Mother	T	A					
	Sister	T						
	Father		P					
XIV	G	T	A	E-O	109	11	1	.999
	H	T	A	E-O	103			
	Mother	T	A					
	No other member							

TABLE 2 (*continued*)

Pair number		Qualitative traits			Quantitative traits			
		Taste for P.T.C.	Hair-on middle segment of finger	Pigmentation of iris	Total ridge count values	Differences in *IQ*	Differences in stature in inches	Chances that twins are monozygotic
XV	I	N	A	E-O	111	8	1	.999
	J	N	A	E-O	121			
	Mother	T	A					
	Sister	N	A					
XVI	K	T	A	E-O	85	2	0	.999
	L	T	A	E-O	87			
	Mother	N	A					
	Father	N	P					
XVII	M	T	P	E-O	64	0	1	.999
	N	T	P	E-O	65			
	Mother	T	P					
	Father	T	P					
XVIII	O	T	A	E-O	100	1	0	.999
	P	T	A	E-O	95			
	Mother	N	A					
	Brother	T						
	Father		A					
XIX	Q	T	A	E-O	82	11	0	.999
	R	T	A	E-O	82			
	Mother	T	A					
	Father	T	P					
XX	S	T	P	E-O	63	0	.5	.999
	T	T	P	E-O	64			
	Mother	T	A					
	Father	T	A					

Pairs I-X are the twins presented in Section V.
A-B indicate the two members of a pair.
P.T.C. = Phenyl-Thio-Carbamide.
T = Taster; *N* = Non-taster.
P = Present; *A* = Absent.
E-O = No observable difference in any zone.

discrepancies occurred between the judgments of the two observers. None was found. The observations were made in bright daylight and both members of the pair were examined at the same time. The zones of the eyes were charted to determine whether both the zones of the members of a pair were the same, whether only the inner or outer zones were alike, or whether neither of the zones was alike. The distributions of the various zones of pigment in the iris were more striking in most cases than the color. Rife indicated that in the cases of all the identical twins studied by him he found the eyes of the members of a pair appearing as similar as the right and left of either individual. "For white children, the distribution and kind[3] of iris pigmentation is, in my opinion, the best criterion of identity and I am coming more and more to rely on it alone." A recent investigation by Gesell and Blake (29) confirms the value of identity of iris pattern as a criterion of monovularity.

The finger and palm patterns were analyzed by M. T. Newman. Not only was the quantitative ridge count computed for application in the formula, but other salient data such as evidence of right for right correspondence, significant similarities in the prints and evidences of reversed asymmetry were recorded. Some investigators have based their entire diagnosis of identicality on this one criterion. Others feel that the value of such patterns has been greatly overrated, but when used in conjunction with other traits such patterns are valuable as indicators. Although one realizes that a diagnosis cannot be made on the basis of dermatoglyphics alone, it is interesting to note that all 20 pairs selected by the experimenter were judged identical on the basis by the finger print analyst.

On the basis of Rife's tables, the intra-pair differences found in the 20 pairs of twins were compared with that of the normal distribution of differences obtained from ordinary sib pairs. His experiments indicated that the total result was a "very convenient measure as to the maximum chances that the members of a twin pair could be that much or more similar and yet be dizygotic (60, p. 342). In Table 2 it will be seen that the likelihood of these twins being monozygotic is very great according to the tests in the formula which was utilized.

Although the diagnosis of zygosity in this investigation was based upon the traits discussed, supplementary evidence of similarities in other traits was also noted. Birth records which were available for 15 of the pairs indicated that as far as foetal membranes may be regarded as indicators, the twins were identical. However, the experimental evidence of Newman (57), and Curtius (22), and others has shown the fallability of such information as conclusive evidence of uniovularity. Although a thoroughgoing set of anthropometric measurements and physical observation would add to the value of the study, the writer felt that in this case the additional contribution would not be commensurate with the time spent and the omission would not in any way reflect on the thoroughness of the study.

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[3] Quoted from a personal letter to the writer.

IV. THE EXPERIMENTAL PROCEDURE

A. Choice of the Subjects for the Investigation

In an investigation of the influence of environmental factors in producing differences in personality, the intensive study of a small group of monozygotic twins seemed more desirable than the cursory study of large numbers of twins. For this reason the number of subjects for this investigation was limited to 20 pairs of identical twins, 10 pairs of each sex between the ages of 10 and 14 years, the two members of each pair living in the same social environment. A survey of the public and parochial schools of Buffalo furnished the information that there were about 200 pairs of like-sexed twins available for study. From this number a preliminary group of subjects was selected upon the basis of the following criteria: similarity in appearance, normal intelligence, attendance in the fifth, sixth, seventh, or eighth grade of the elementary school, and availability for study, the last dependent upon the coöperation of the family, school, and, in a few cases, the twins themselves. To each of these pairs were then applied the criteria for determining zygosity which are described in Section III and the 20 pairs were finally selected.

In Table 3 data are presented showing the composition of the group in respect to chronological and mental age, intelligence, and grade status.

It will be noticed that three of the pairs are not of normal mental ability according to the Binet classification. In a few cases, the choice had been made on a previous mental examination and after a repeated Stanford Binet, the writer found discrepancies between the scores of the two examinations. As the entire experimental procedure had been carried out and excellent contact made, these pairs were retained. However, in the group of 10 pairs who were retested and studied intensively, the *IQ*'s were well within the range of normality—93 to 107.

The difficulty of finding a fairly large group of identical twins of at least normal mentality was an interesting fact disclosed in this search. The lower average mental ability of this group as compared to that of other types of twins and of the unselected population is confirmed by a study of Ruth Byrns, in which she found the median test percentile on the Henmon-Nelson Test of 376 twins discrepancies occurred between the judgments of the two observers. None was found. The observations were made in bright daylight and both members of the pair were examined at the same time. The zones of the eyes were charted to determine whether both the zones of the members of a pair were the same, whether only the inner or outer zones were alike, or whether neither of the zones was alike. The distributions of the various zones of pigment in the iris were more striking in most cases than the color. Rife indicated that in the cases of all the identical twins studied by him he found the eyes of the members of a pair appearing as similar as the right and left of either individual. "For white children, the distribution and kind[3] of iris pigmentation is, in my opinion, the best criterion of identity and I am coming more and more to rely on it alone." A recent investigation by Gesell and Blake (29) confirms the value of identity of iris pattern as a criterion of monovularity.

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TABLE 3

INTELLIGENCE QUOTIENTS (*S-B*) OF TWENTY PAIRS OF IDENTICAL TWINS

Boys						Girls					
Pair number	*CA* in months	*MA* in months	*IQ*	Intra-pair Diff. in IQ	Grade	Pair number	*CA* in months	*MA* in months	*IQ*	Intra-pair Diff. in *IQ*	Grade
I	136	136 137	100 101	1	5	I	130	130 137	100 105	5	5
II	161	145 149	89 93	4	7	II	169	171 170	101 101	0	7
III	163	165 165	101 101	0	8	III	194	133 132	79(14) 79(14)	0	8
IV	145	116 117	80 81	1	5	IV	146	143 145	98 99	1	6
V	173	158 139	91 80	11	8	V	164	155 170	93 104	11	7
VI	135	136 136	101 101	0	5	VI	135	132 123	98 91	7	5
VII	142	139 142	98 100	2	5	VII	176	163 156	97(14) 93(14)	4	7
VIII	160	168 168	105 105	0	8	VIII	160	139 126	87 79	8	7
IX	134	137 137	102 102	0	5	IX	143	111 127	78 89	11	5
X	154	146 153	95 99	4	5	X	137	139 142	101 105	4	5

Inter-twin correlation of intelligence = .81±.0367.

was more than 10 points lower than that of the general population of high school students (17). The median percentile of the girl twins was 14 points lower than that of the unselected group; the boy twins were less than four points and the group of unlike-sexed twins, which does not include the identical type, approached most closely the mental ability of the entire group of high school children.

B. ADMINISTRATION OF THE TEST

1. *Test Material.* The standard Rorschach ink-blots were used.

2. *The Plan Adopted.* The test was given to 20 pairs of identical twins, the two members of each pair being tested in succession so that any discussion by the subjects was avoided. After an interval of six months, five pairs of twins of each sex, chosen on the basis of their average intelligence (90 or above) and availability for retesting, were again given the test. In order to prevent inconsistencies in the administration and scoring of the Rorschach tests, as well as differences resulting from the personal relationship between examiner and subject, all tests were given, recorded, and scored by the experimenter.

3. *The Testing Procedure.*

a. Introduction and instructions.

The experimenter placed herself in such a position that the cards could be presented easily to the subject and be visible at the same time to the examiner. Some explanation of the writer's interest in twins and a desire to learn more about them had prefaced the test, so that in only one case was there a lack of interest and a negativistic attitude shown. As each card was presented, the subject was asked, *"What do you see?" or "What can that be?"*—the procedure used by Rorschach (61), Loosli-Usteri (44), and Beck (5*a*). No explanation was given. If the subject hesitated, the experimenter discussed the fact that there were no right or wrong answers in this test, and that anything the picture suggested to him should be given. In cases where the child did not turn the card from the original position presented, he was informed that he might do so, and encouraged to give additional responses. No information was given as to the length of time to be allowed or the number of responses that should be given. In those cases where the children inquired as to the length of time, they were informed that they could take as long as they wished. There were three cases in which the number of responses became excessive and justified curtailment by the experimenter. For the sake of accuracy of technique throughout the entire 40 cases, however, these subjects were allowed to continue without being cut short. At no time did the examiner interrupt the spontaneous flow of responses with questions.

b. Verbatim recording of the spontaneous answers.

Responses to the cards were recorded verbatim, including any remarks made by the subject about the test or his performance. To facilitate rapid recording, the *"V"* in different positions was used as suggested by Loosli-Usteri (44). In addition, each response was carefully traced on a mimeographed form of each card in its correct position and numbered accordingly, as advocated by Vernon (72). This eliminated any doubt as to its classification later on.

c. The inquiry.

After the subject had gone through the 10 cards, the experimenter stated that it would be very interesting to look over the cards again, thus permitting the examiner to inquire into the factors determining the subject's responses. Leading questions were obviously avoided. The total time of the presentation and also any interval greater than five seconds elapsing between responses were noted.

C. Scoring of the Responses

Each response was considered, first, in respect to its "mode of apperception," response to the blot as a whole, to details, etc.; second, its "quality"—form, movement, or color; and, third, its "content" and originality. A psychogramm was then constructed for each twin and this, with the original records, furnished the basis of the interpretation and comparisons of the two members of the pair. The same data were also used in determining the inter-twin correlations and reliability, the statistical technique used being discussed in the next section.

D. SCORING SYSTEM ADOPTED

The need for systematic refinement of the scoring method has been recognized by many as one necessary step in the elimination of the deficiencies of the Rorschach method. The system of refined scoring symbols proposed by Klopfer and Sender (38) which has resulted from the work of several research groups in New York City has been adopted for this investigation.

E. QUALITATIVE ANALYSIS OF THE DATA

Analysis of the protocols was carried out according to a consistent scheme, so that the comparison of both general and specific factors in the personality make-up of the twins might be facilitated. It should be emphasized, however, that the interpretations were not based solely on the psychogramms presented in Section V, but also upon the verbatim protocols and results of careful observation of the subjects which do not appear in the tabulations and which obviously could not be included in this study. Cues to behavior such as the subject's attitude during the test, spontaneous remarks and criticisms of the ink-blots and the test in general, exceptional reactions to certain pictures, gestures, method of approach, hesitation and signs of blocking, and evidences of a perseverative tendency, were carefully noted. It should also be pointed out that diagnosis is not based upon the interpretative values of the separate categories alone, but also upon their interrelationships and their relation to the total number of answers. That is, the determination of the "Erlebnistypus" cannot be based solely on the number of movement responses and the total color reaction but must take into consideration the intermediate categories (Chiaroscuro, texture responses, and quality of the form answers).

In the interpretation of the results the experimenter first compared the distribution of psychic energy (including Rorschach's "Erlebnistypus") in the two members of a pair: the probable original distribution or constellation if indicated, the general type of development at the time of the test, and in the way it differed from the original pattern. The degree of emotional stability, impulsiveness, and egocentricity was also examined. Second, evidence on mental approach to life (Rorschach's "Erfassungstypus") was considered: the general level of mental ability and the rôle played by intelligence in the total personality structure, the kind of intelligence, i.e., abstract or concrete; the degree of flexibility and elasticity, combinatorial ability and degree of systematization in thinking, whether rigid, elastic, careless or confused; the degree of versatility; the relationship between imagination and intelligence.

It is important to note that the test was administered and the protocols analyzed independent of any knowledge of the social histories of the subjects, so that the interpretations were in no way biased by previous knowledge of temperamental resemblances and differences in the twins. Interpretations which are not made with such supplementary information no doubt reveal much less than ones based on some knowledge of the social histories, but the procedure was necessary in this case to preclude the possibility of bias. The brief summaries which preface the discussion of each of the pairs of twins are based upon information and observation by the experimenter during a period of almost two years, contact being made with the children not only during the testing procedure but in other types of social situations. From time to time in the discussion the reader will note that the results of the Rorschach have been interpreted in the light of the facts revealed in the social history, but these comments have been clearly designated as such.

F. EXPERIMENTAL PROCEDURE IN THE QUANTITATIVE ANALYSIS

The comparative qualitative study of the Rorschach records seemed to indicate certain very definite and striking conclusions. In view of the lack of scientific data it seemed very desirable to submit these data to some type of analysis which might reveal in quantitative terms the amount of similarity in the personality development of the members of a pair. Previous research, however, with the unsatisfactory results obtained from the application of the standard correlational technique to the separate categories, and the resulting disregard of the interrelations of these categories in the total picture, have shown the inapplicability of this test as an instrument for large scale statistical research. The method of correct matching proposed by Vernon (71) for the study of personality, and used by a large number of investigators, seemed applicable because it would permit quantitative relationships based upon qualitative judgments of the personality as an integrated whole rather than the personality as seen in separate categories.

Vernon (71) reports an experiment in which the "blind" diagnosis of the personalities of 45 subjects based on Rorschach protocols were matched with personality sketches by one or two judges, the matching done in small groups of 3:3 to 10:10. He obtained a high validity of 0.833±.0315, and contrasted it with the low coefficients usually obtained when scores on various categories of the Rorschach were correlated with other measures of traits and abilities. He says, however, that the comparison is not conclusive because the same subjects were not employed in both experiments and the heterogeneity of the groups was not known.

Experiments by Allport and Cantril (2) and by Vernon (68) indicate a much higher relationship when judgments of the total personality were matched with sketches than when judgments of isolated traits were used. Rosenzweig has planned a large scale investigation of the validity of the test by means of the matching technique (63). Vernon (71) has presented a comprehensive survey of the research employing this method and an evaluation description of the procedure for the study of personality organization.

In the procedure used here, unavoidably complicated due to the co-twin set-up, one member of each of the 20 pairs of twins was designated by the letters *A*1-*A*20 and the other member *B*1-*B*20. The retests of 10 of the pairs were indicated by *a*1-*a*20. Six judges, who were chosen on the basis of skill and experience with the Rorschach test, were requested first to match the psychogramms of the 10 pairs selected for retesting with their retests, the matching being done in groups of 10. Only the psychogramms were matched for reliability. The undesirability of matching the protocols is obvious because of the factor of identical answers. The judgments were recorded on a blank enclosed with the data and directions were also given to read an enclosed sealed semi-key. In the semi-key the judges were directed to match five psychogramms with five selected psychogramms from the retests and record the results. Two sets of results were thus procured from each judge. These data were used in the study of the relative suitability of the 10:10 and 5:5 matching method.

The judges were then requested to follow the same procedure in the inter-twin matchings. In this case the protocols were included with the psychogramms in order to give the judges the complete picture of the subject's personality as shown by the test. No identifying data such as ages or sex of the twins were given.

V. COMPARATIVE QUALITATIVE ANALYSES OF PERSONALITY DEVELOPMENT IN TEN PAIRS OF IDENTICAL TWINS

Case Study Number One—*"A"* and *"B"*

Summary. *"A"* and *"B"* are twin girls 11½ years of age whose parents were born in Hungary and came to this country at an early age. The mother was 17 at the time of her marriage and now has nine children, the youngest four years old, all living at home. In 1934 the mother was admitted to the State Hospital for the insane—diagnosis, dementia praecox, paranoid type. The etiological factors of the mother's breakdown were said to be (*a*) disappointment in marriage and (*b*) frequent pregnancies. She was paroled in 1936 and the home which had been broken up was again established. The father, a mechanic, is regularly employed. For several years before the mother's commitment there was constant quarreling in the home and the mother still accuses her husband of infidelity, with a consequent poor marital adjustment.

At the time of the mother's commitment the twins were placed in a foster home where they adjusted very satisfactorily. After several months they were placed in an orphanage with the other children. While in the orphanage *"A"* apparently adjusted well until her mother came visiting, at which time she became nervous, jumpy, and pulled her mouth to the side. She was examined and said to be hyper-active, and there was a tentative diagnosis of possible chorea, but she was never hospitalized. Every time the mother came *"A"* begged to be taken home. She finally was taken home though the other twin remained in the orphanage several months longer. Toward the end of her stay in the orphanage the Sisters reported that they noticed a change in *"A."* She seemed to "withdraw into herself" and became very irritable. Her school work became poor and her handwriting, small and cramped. They noticed that she "twitched a lot" and began to clench her right hand, at the same time holding it flexed.

After the children were returned to the home, the mother reported no difficulty with *"B"* but reported that *"A"* was "nervous, had terrible dreams, and was afraid to take a bath in a tub." She quarreled continually with her younger brother and with her twin. She told her mother, "I'm the black sheep. You like *'B'* better."

TABLE 4
PSYCHOGRAMMS "*A*" AND "B"

Category of response	First test		Second test	
	"*A*" (121)*	"*B*" (34)	"*A*" (94)	"*B*" (44)
W	14	0	11	1
D	36	11	25	14
d	18	13	19	16
dd	40	9	24	12
S	13	1	15	1
M	12	0	7	0
FM	29	11	20	7
m	6	0	0	0
KF	24	0	0	0
FK	0	1	0	2
F	40	20	60	33
c	2	0	4	0
FC	7	1	3	1
CF	1	1	0	1
C	0	0	0	0
Σ*C*	4.5	1.5	1.5	1.5
H	12	0	8	0
Hd	14	4	9	6
A	44	4	36	11
Ad	18	16	12	14
A Object	1	0	0	0
Nature	12	3	14	0
Geography	5	2	4	2
Object	10	4	5	4
Architect.	3	0	4	5
Plant	1	0	1	1
Spec. group	1	1	1	1
% Original	0	0	28	4
% Popular	1	9	5	15
% Animal	52	59	51	57
H + *A*	56	4	44	11
—	—	—	—	—
Hd + *Ad*	32	20	21	20

*= Number of responses.

The mother was advised to take "*A*" to the Child Guidance Clinic. Here the psychiatrist was impressed by "*A*"'s marked feeling of inferiority, not only socially but academically. She feels constantly threatened by her twin in her relationship to her mother and feels that the mother favors "*B*." She projects her difficulties onto "*B*" and is glad of any occasion to contrast herself with "*B*" and so win approval. The mother has rejected the child (*"A"*) and has identified her with her husband's sister who was "queer" at one time. She is worried that *"A"* will become like her.

The *IQ* of *"A"* is 101 and of *"B,"* 107. The Rorschach test was given to both members of the pair while they were in the orphanage.

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF *"A"* AND *"B"*

The results of the Rorschach test in the case of this pair of twins are particularly interesting in view of this recent personality maladjustment which has developed in one twin. In both girls there is evidence which suggests an original introversial personality constellation. That is, the activity of the inner life is the main source of energy. But in spite of this basic similarity, they are rather widely different, the dissimilarity remaining constant over the half year interval. The high number of answers of all introversive types (movement, form movement, minor movement tendencies, and chiaroscuro) given by *"A"* indicate that she is suffering from an immense overflow of promptings from within, an effort to canalize this overflow meeting with some success in the second performance. The increase in the number of form answers from 30 to 63 per cent in spite of the smaller number of answers in the second performance, suggest an increase in intellectual control. This is accompanied by the disappearance of minor movement and shading answers, perhaps indicating less turmoil and haziness in the inner life. The decrease in the number of movement responses (*M*) to about one-half of the original number, but less decrease in the more intellectually controlled form movement responses, together with the general reduction of color reactions, may indicate an attempt to counteract the overflow of energies by means of a constrictive tendency. The fact that half of the third grade details are inside details, increasing in number at the second performance, makes the presence of this type of response a conspicuous factor.

While in *"A"* there was evidence of a strong introversial tendency showing traits of anxiety, one gets the impression that the introversial urges have been less strong in *"B."* What is seen is a much more constrictive attitude (Rorschach's coartation), the degree of constriction increasing in the second performance (20 *F* out of a total of 34 in the first performance and 33 out of 44 in the second).

The degree of constriction is seen in the percentage of form answers compared with both movement and color. (*M* and *C* must approach zero to establish complete constriction.) An amazing dissecting attitude demonstrated in both performances in the content (absence of any whole human figures together with the large number of human and animal details) and the general inquisitiveness, as seen in the high percentage of third grade details, suggest the presence of an anxiety attitude, but to a much less degree than in her sister's case. During the period between the two tests, *"B"*'s basic attitude did not change markedly. The increase in types of responses other than human and animal answers from 10 to 13 and the increase in whole animal answers from 4 to 11 suggest a more variable approach. She has apparently succeeded in covering up the danger of the overdevelopment of the whole inner life by an analyzing attitude.

The distribution of psychic energy as seen in these twins is particularly interesting in view of the mother's history of schizophrenia of the paranoid type, since the prevailing introversion of the twins shows a basically similar personality type to the one of the mother. According to Rorschach, this type of psychosis is based upon a prevailing introversive constellation. In recent Rorschach studies of schizophrenia, Skalweit (67) has pointed out further that an introversive or schizoid personality constellation does not imply an inclination to be schizophrenic. The development of the real schizophrenic disease process has a destructive influence on the introversial constellation within the course of the disease.

In respect to emotional structure in these twins, the presence of the texture answers in *"A"* while none is evident in *"B"* indicate *"A"*'s greater sensitivity. While *"A"*'s distribution of color responses (seven *FC* and one *CF* in the first performance, and three *FC* and no *CF* in the second) seems to indicate a further retreat into introversion, *"B"* appears to be better able to keep the balance between the introversive and extratensive tendencies, 1 *CF* and 1 *FC* in each performance, the remaining color-form answer indicating adjustment rather than impulsiveness. Although the number of human figures would suggest *"A"*'s greater interest in human problems, the actual relationship to other people does not play a very important rôle in the life of an individual with such introversive tendencies. Of 121 answers in *"A"*'s first performance, only 10 given had to do with reaction to stimuli from without; in the second, only 7 out of 94.

The mental capacities of both twins are within the upper range of normality, but show some interesting qualitative differences. *"B"*'s answers show more clarity and sharpness of details, suggesting more precise observation, while the range of content and versatility of association in her twin gives the impression of a more vital and colorful mental life. The number of first grade details indicate *"B"*'s tendency to concrete thinking, whereas her twin shows more inclination to abstract thought, evidenced in the number of whole answers and the tendency to combine. The number of whole answers is abnormally large for a child of this age. In the first performance *"A"* attempted to give a whole answer to each of the seven cards, four times successfully; in the second performance, in every card but the last, only two of which were unsuccessful. While intelligence is the decisive factor in the total personality of *"B"* as evidenced by the percentage of form answers and the prevalence of *FM* and *FK*, imagination appears to dominate the entire personality make-up of *"A."* However, the increase in the number of form answers, the disappearance of chiaroscuro, and the decrease in *M* and *FM* in the second performance, point to a strenuous attempt on the part of *"A"* to control the imagination—an attempt which is not altogether successful because she pays for it in her feelings of anxiety.

Conclusion. This comparative study shows how different the quality of personality make-up in a pair of identical twins with similar basic personality constellations may become in the process of development.

CASE STUDY NUMBER TWO—*"C"* AND *"D"*

Summary. *"C"* and *"D"* are twin boys of English descent, 11 years old, attending the sixth grade of an elementary school. The intelligence quotient of each is 102 and their school progress is average. There are no other siblings. The boys are inseparable and cause so much commotion in the school due to their combined pugnacious activities that they have been separated and placed in different sections. *"D"* appears to be much more dominant and is recognized by his twin as the leader. They seem to get along well with other children, though they have a tendency to pugilistic encounters. The father, a salesman, encourages them to wrestle with any available adversary. The entire family is extremely interested in the boys' educational progress.

Comparative Analysis of the Rorschach Protocols of "*C*" and "*D*"

These two boys present an interesting study of dissimilarity in tempo of personality development of monozygotic twins. In "*C*" the typical pre-puberty state of mind is seen. The evidence of the "negative phase" can be seen vividly in three different appearances in the protocol.

TABLE 5

Psychogramms "*C*" and "*D*"

Category of response	First test		Second test	
	"*C*" (11)	"*D*" (26)	"*C*" (10)	"*D*" (24)
W	4	5	3	5
D	5	19	4	18
d	0	1	0	0
dd	0	1	0	0
S	2	0	3	1
M	0	1	0	1
FM	5	6	2	5
m	0	0	0	0
KF	0	1	0	1
FK	0	1	0	1
F	5	13	7	12
c	1	2	1	1
FC	0	1	0	2
CF	0	1	0	1
C	0	0	0	0
Σ*C*	0	1.5	0	2
H	0	2	0	2
Hd	0	0	0	0
A	6	11	4	10
Ad	0	3	0	2
A Object	1	2	1	1
Anatomy	0	0	0	0
Nature	0	3	0	4
Georaphy	0	0	0	0
Architect.	0	1	0	0
Object	4	2	5	2
Plant	0	1	0	2
Spec. group	0	1	0	1
% Original	27	27	20	21
% Popular	36	8	50	8
% Animal	55	54	40	50
H + *A*	6	13	4	12
Hd + *Ad*	0	3	0	2

1. There is the constrictive tendency typical of pre-puberty which is seen in the complete absence of both color and movement. "*C*" is loathe to give away much of his inner life or to react readily to stimulation from without (Rorschach's coartative tendency).

2. A dominant oppositional trend is seen in the frequent use of the white space and the absolute lack of color.

3. The avoidance of human problems, the adherence to mechanical things and the narrow range of content are also typical of the pre-adolescent phase. Instead of an interest in human beings and human problems, there is a distinct perseverative tendency to cling to speed boats as representative of a mechanical force. The response to the first card was *"a rocket ship; the control cabin is on the top and the thing on the bottom is the fin."* A second response to one section of the picture was, *"a speed boat with a keel. The white are the cabin windows."* The second card also represented a speed boat. *"The red at the top is a windshield and the boat is drifting."* Card VII was also interpreted as a cabin boat.

Thus the main emphasis is on the critical intellectual approach accompanied in decreasing degree by the child-like activity of the inner life (decrease in *FM*). The increase in critical form perception and decrease in form movement answers (five *FM* and five *F* in the first performance and two *FM* and seven *F* in the second) and the increase in the use of white space give the impression that "*C*" is still in the pre-puberty stage of development. As yet there is no evidence of dilation indicating a readiness for movement and color.

The one texture answer but no color may indicate an apparent ability for adaptation to a given situation, but little use is made of the capacity at present because of the oppositional trend.

"*D*"'s developmental picture is quite different. There is evidently much less constriction than in his twin (one *M*, one *FC*, one *CF*). More readiness to react to stimulation from without increasing in the second performance (two *FC* and one *CF*) is seen. There is also less evidence of an oppositional trend and much more awareness of human problems, (no *S* and two *H*). The real *M* and color responses and the distribution of the intermediate categories indicate an ambiequal state with more inner than outer life both potentially and actually. The real *M* with 5 *FM*, 1 *KF* and 1 *FK* show the potential as well as the actual capacity for inner life; on the color side the constellation 2 *C*, 1 *FC*, 1 *CF* changes to 1 *C*, 2 *FC*, and 1 *CF*, indicating also some shifting from potential to actual extraversion. While little or no signs of personality maturation were visible in *"C"* during the half year period, in *"D"* the increase in form-color reactions and decrease in animal percentage as well as the change in color responses point to definite maturation.

The fact that these two boys were separated in school at the beginning of the year may emphasize *"C"*'s dependence on his twin so that to him the separation is a handicap and to his twin, a release.

It is impossible to predict the emotional set-up in *"C"* because the personality pattern is so completely dominated by his age situation with its typical constriction, as seen in the lack of color and movement. The one texture answer he gives may be considered indicative of a sensitivity for things going on around him. In the second performance his remarks about color and his use of the black and grey—*"A bear rug. It's the shape of one and it's black or grey."* —*"It's a pink bear although I never saw one."*—would suggest a readiness to adjust. However, this is postponed at present by the negative attitude. *"D,"* on the other hand, is apparently much more ready for emotional reactions than his brother (one *FC*, one *CF*) with evidence of improvement in the second performance, (two *FC*, one *CF*). The way in which both boys deal with wholes and halves, the use of texture, and, in the case of *"D,"* the color, suggest that both have a good grasp of things going on around them. In *"C,"* however, there is not much active participation beyond that. These findings are interesting in view of the dominance and leadership of *"D,"* as reported by observers.

Qualitative analysis yields some interesting dissimilarities in mental approach to life. The percentage and quality of the whole answers indicate that *"C"*'s mental capacity is probably good. There is a definite improvement in form conception in the second performance. The original solutions are spoiled by the speed boat complex (40 per cent) which covers everything in the contents besides animal and animal objects. He does not use many details but is not led too far astray by the speed boat because one-third of the responses in the first performance and one-half in the second are popular ones. *"D"* is somewhat more daring, keen, and original (more *D*'s and more variety in type; one real *M*, versatility in content; more variety in the kind of original answers).

In spite of the fact that the *IQ*'s of these twins were identical, general observation showed *"D"* to be more alert and interested in the Rorschach but bored with the Binet. He also does superior school work.

At the present time *"C"* uses his imagination for his boat complex, but it can be assumed that there are capacities in that direction which he now uses only to build up speed boats in various ways. He will probably be able to use it constructively after the complex has been overcome. However, imagination will most likely remain subordinate to intellectual control. *"D,"* on the other hand, appears to exhibit much more imagination in various original solutions and combinations (a frog on top of a bell) and very careful elaborated *FK* responses.

Conclusion. Here again may be seen twins with apparently similar basic personality patterns, but differing mainly in tempo of development accompanied by some difference in quality.

CASE STUDY NUMBER THREE—*"E"* AND *"F"*

Summary. *"E"* and *"F"* are very attractive girl twins, 12 years of age, born in Dublin, Ireland, and brought to this country at an early age. Following their father's death shortly after their arrival in this country, their mother obtained work as a charwoman in a high grade parochial school and convent. Although her income has been very limited, supplemented only recently by a widow's pension, the children have had the advantages of superior educational training in a private school referred to above, and music and dancing lessons as the result of interest in them as twins. The *IQ* of *"E"* is 98, of *"F,"* 99. There is one sibling, a boy of 16 now being trained in preparation for the priesthood because of his outstanding ability in leadership. Although very shy and reticent as the result of a more or less sheltered childhood, the girls appear to have many companions in the neighborhood and to spend a rather surprising amount of time apart from each other. *"E"* appears to be much more dominant, assuming more of the responsibility both in the home and outside. She becomes acquainted with strangers much more rapidly. *"F"*'s extreme diffidence made the initial testing rather difficult.

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF "E" AND "F"

Although both members of this pair appear to be alike in basic personality make-up, interesting dissimilarities may be observed in the present state of development. These girls more nearly approach each other in the second performance than do the two previous pairs.

TABLE 6

PSYCHOGRAMMS "E" AND "F"

Category of response	First test		Second test	
	"E" (28)	"F" (25)	"E" (28)	"F" (33)
W	1	1	2	0
D	22	10	19	11
d	3	11	4	17
dd	0	3	0	3
S	2	0	3	2
M	1	0	0	0
FM	3	10	2	10
m	0	0	0	0
KF	0	0	0	0
FK	0	0	0	0
F	14	12	19	21
c	3	3	3	2
FC	6?	0	3?	0
CF	1	0	1	0
C	0	0	0	0
Σ*C*	4	0	2.5	0
H	1	0	0	0
Hd	2	1	0	9
A	9	8	8	7
Ad	4	13	3	15
A Object	1	2	2	0
Anatomy	2	0	2	0
Nature	0	0	0	0
Geography	0	0	0	0
Architect.	0	0	0	0
Object	8	0	12	0
Plant	0	1	0	1
Spec. group	1	0	1	1
% Original	0	16	11	12
% Popular	11	16	11	6
% Animal	46	84	39	67
$\frac{H + A}{Hd + Ad}$	$\frac{10}{6}$	$\frac{8}{14}$	$\frac{8}{3}$	$\frac{7}{24}$

They were, however, as unlike in the first performance as "*C*" and "*D*" were in the second. In "*E*" the disappearance of movement, few indications of form movement, and the decrease in color in the second performance point to an increasing constriction, approaching the very constricted attitude seen in "*F*." The fact that the constriction affects the inner life more strongly than stimuli from without might indicate a basically stronger extroversion, but the fact that both sides are further constricted in the same degree in the second performance suggests a basic structure near the ambiequal point, on a coartative level. The evidence for this fact may be seen in the increase in pure forms from 14 to 19; a decrease in form movement answers from three to two; no evidences of chiaroscuro; decrease in the questionable form-color responses; disappearance of the human element along with the worry about human problems which fail to take shape (man without a head) and a stereotyping in content. This still more elaborate formation of the dominant structure of the psyche in the second performance suggests that the constriction in this case is not a transitory state or a matter of age. It is possible that "*E*" has been in the dilated phase of puberty and has become more constricted, retaining this constriction permanently. However, only by repeated Rorschach tests can this fact be more fully determined.

In "*F*" the evidences of constriction are much greater than in her twin (no color or movement). In fact, they are great enough to suggest the presence of neurotic traits. Besides biological anxiety which is seen in the fear of all changes going on within and the necessity of rearranging the relations to the surroundings according to these changes, there is evidence in both girls of individual anxiety. This is seen in the formal approach, taking smaller and smaller details in order to get correct forms, avoiding color completely but showing sensitivity to texture; preferring parts of figures to whole animal or human figures because the forms are never good enough. In the second performance the eight additional answers all increase the number of form answers. One surprising fact is "*F*"'s increased number of human details from one to nine in the second performance while "*E*" showed a decrease in *Hd*. It is this increase in human details (the change in the proportion $\frac{H + A}{Hd + Ad}$ from $\frac{8}{14}$ to $\frac{7}{24}$), the second grade normal details and white space answers which suggests the danger of the neurotic pattern. The stereotyping effects of this anxiety comes out in the 15 animal details. A shoe and the bark of a tree were the only type of response other than animal or human details given. Thus the dominant structure of the second performance is also anxiety.

While *"E"*'s achievement in emotional adjustment is not clear because of the doubtful form-color answers, there is perhaps a tendency toward increased control. Her twin's actions, on the other hand, appear to be emotionally overcontrolled (no color).

In both girls the mental capacity which is centered around sharp logical thinking, as evidenced in the attempt to accept only form interpretations which fit exactly, is handicapped by the neurotic pattern which produces meticulousness. This meticulousness, which is seen more strongly in *"F"* than in *"E,"* results in a lack of daring. In *"E"* the lack of *M* seems to indicate that imagination does not play any rôle in her mental approach. However, the repressed urge is shown by the only movement answer which slipped through—in Card *X* "men without heads shaking hands with something." On the other hand, the activities of the inner life play some part in her sister's personality set-up, but are more or less restricted to the rôle which they play in her anxieties, since they do not lead to any free expression of action. Her *FM* answers were restricted to "open mouths," and "dog with paws out."

Perhaps these factors reduce the *IQ*'s of the twins somewhat, but the capacity of each is within the normal range. *"E"*'s mental approach appears to be somewhat more vital, as indicated by the color reaction which breaks through in spite of her intellectual control, and is much more closely related to everyday reality (higher percentage of *D*). Her answers, scarcely one of which had no elaboration of smaller details, are typical of her critical attitude of pre-puberty. However, the evidence suggests that in other phases of mentality she has an optimum development. The animal answers, four animal details and eight objects, show a favorable distribution. There is a nice balance in the three popular and three original answers.

"F"'s mind appears more "inquisitive" in comparison with her twin.[4] She gave only 10 first grade details as compared to 14

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[4] "Inquisitive" is here used with a special meaning: A boring and penetrating interest.

second and third grade details in the first performance, and 11 first grade details as compared to 20 first and second grade details in the second performance. She appeared to be interested in seeing what she was able to figure out as shown by her edge detail answers. Her inquisitiveness has a stereotyped pattern, however, due possibly to her anxieties.

Conclusion. These twins are more alike in personality development than the two previous pairs. The same basic personality constellation is evident and observable differences are ones of degree and not of kind. They seem to become more similar after the half year interval. *"F,"* however, exhibits more neurotic tendencies, and if this trend in development continues, the twins may become more and more unlike.

CASE STUDY NUMBER FOUR—*"G"* AND *"H"*

Summary. *"G"* and *"H"* are male twins, 12 years of age in the sixth grade. The parents were both born in Hungary and came to the United States with the three eldest children. Both parents have great difficulty in expressing themselves in English, Hungarian being spoken in the home. There are 10 siblings, all older than the twins. The home offers little, the father having been unemployed for seven years and dependent on public relief. There is little parental supervision. The boys spend most of their time together, but with other boys in the neighborhood. *"G"* is apparently much more aggressive, making the plans for the two, choosing the library books, and keeping the joint funds. *"H"* suffers from a serious cardiac ailment which limits the amount of physical exercise. Their school progress is average at present, although they did have some difficulty in the first grade—no doubt a result of the language handicap. The *IQ* of *"G"* is 95 and of *"H,"* 99. Both are such avid readers that close supervision by the teacher is reported necessary to keep them from reading during school hours.

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF *"G"* AND *"H"*

In *"G"* is seen an almost ambiequal personality type. In the first performance he is as much concerned with the development of the inner life as with things going on around him. The relatively large number (4 or 5) of texture answers suggests a high degree of sensitivity to his surroundings. The marked consistency between the two performances of the test is significant; the total number of responses is the same and only half of the responses are more or less repetitious, the other half showing the same pattern. Within this consistent personality set-up, however, there are changes which indicate that during the half year between the performances there has

TABLE 7

PSYCHOGRAMMS "*G*" AND "*H*"

Category of response	First test		Second test	
	"*G*" (18)	"*H*" (23)	"*G*" (18)	"*H*" (17)
W	7	6	8	7
D	6	14	8	9
d	0	0	0	0
dd	3	2	2	0
S	2	1	0	1
M	2	7	5	4
FM	2	3	2	3
m	0	0	0	0
KF	0	0	0	0
FK	0	0	0	0
F	8	10	4	7
c	4	2	5	2
FC	1	1	1	1
CF	1	0	1	0
C	0	0	0	0
Σ*C*	1.5	.5	1.5	.5
H	2	8	5	5
Hd	4	2	2	0
A	0	4	4	7
Ad	2	3	2	1
A Object	3	1	1	1
Anatomy	0	0	0	0
Nature	0	1	0	1
Geography	3	0	1	0
Architect.	0	0	0	0
Object	4	2	3	1
Plant	0	2	0	1
Spec. group	0	0	0	0
% Original	11	26	17	24
% Popular	17	17	5	24
% Animal	11	30	33	47
H + *A*	2	12	9	12
Hd + *Ad*	6	5	4	1

been a definite process of crystallization of personality. Evidences of dilation may be seen in the increase of movement and texture responses and the additional use of color which does not appear in the psychogram. This trend is accompanied by integration, which may be seen in the increase of wholes and first grade normal details and the increase in movement and human over human detail responses, all pointing definitely toward maturation.

Certain concepts which are merely indicated in the first performance are carefully developed in the second. For example, in Card II, the toe dancer is repeated but the red net named in the first performance is elaborated into a crepe paper masque. In Card III only the frog was used the first time, but when repeated the answer was enriched by two additional comments interpreting a figure in action. In Card VII the two dancers were discovered only in the second performance. One figure in action—the falling figure in Card X—is dropped in the second performance. When this card was presented *"G"* became rather perturbed and after the fallen figure response he retreated to edge answers and one easy geographic response, this confirming his confusion. In his second performance to Card X his perturbation was only visible in the restriction of his answers to two out of the numerous possible details. These two answers, however, are more intelligible, common-sense answers than the ones in the first. The step toward maturation is visible also on the extraverted side. The increase in texture answers accompanied by a simultaneous decrease of *F* and increase of *M* suggests an increased sensitivity to his surroundings. Color itself is only increased in the additional details and does not appear in the psychogramm. Thus *"G"* appears to be going somewhat from ambiequality toward a slightly more introversive type of set-up, but he still retains the balance.

The extensive movement answers given by *"H"* would seem to indicate that he is somewhat more introversive than his brother. Whereas *"G"* appears to have counter-balanced the introversial trends, his twin's general behavior and remarks during the performance pointed to blocking in development, this trend becoming more strong in the second performance. This blocking can be seen in both the introversive and extratensive sides. His movement responses were hesitating blocked action—*"They just have their arms out"*—*"She is looking away"*—*"A man is holding a stick and* *sitting down and waiting with a club for some one."* His color reactions were restricted mainly to white. In Card IX in the first performance he gives a snowman. In the second performance color is only mentioned but not really used.

Thus *"G"* appears to be carefully dilating his gestalt, which was inwardly less developed than his twin in the first performance. And *"H"* shows a somewhat constricted attitude in respect to the development of his inner life without developing the extroversial side. For this reason the actual personality pictures of the two boys appear to be more similar in the second performance than in the first. But this superficial similarity is misleading because it is the result of an opposite trend.

The most important difference in personality make-up of these twins appears in emotional structure. While sensitivity is the dominant pattern in the personality of *"G,"* accompanied by a strong tendency to emotional adjustment (increase in *c* and one *FC*, one *CF*), in *"H"* the evidence points to a low degree of sensitivity (low number of *c*) and less tendency to adjust. As a result of this predominant introversion he seems to display little interest in what is going on around him and readily withdraws within himself. He rationalizes the color stimulus in order to get rid of it (Card II—*"the red legs and head of an insect"*) or avoids color completely. In the last three colored cards, there is no use of color in either performance other than the snowman, but movement responses are given in each performance. This might suggest that *"H"* is running away from the color stimuli into the introversial side.

These boys are quite similar in general mental make-up, but show some interesting qualitative differences. Evidence of a considerable amount of combinatorial power and integration may be seen in the number and quality of the whole answers and movement responses in *"G."* The range of content and the whole and movement responses indicate versatility and elasticity of mental approach. Evidence of a marked increase in self-assurance is seen in the disappearance of *S* and edge answers, the increase in the number of wholes, first grade details, and movement. In the second performance *"G"* also gave an answer to Card VI—*"some kind of a fur"*—which he refused ,the first time and elaborated his response in Card IX—*"some kind of a lake in the land; here's the coastline with rocks and reefs."* This more elaborate geographical answer in

Card IX is the only remaining response of this type given in the first performance and used obviously as a refuge (geographical maps *may have any shape*). The increase in the number of whole human and animal figures and movement responses in the second performance suggest a more daring approach.

Although *"H"* approaches his twin rather closely, there appears to be less flexibility and versatility in his approach (narrower range of content and smaller percentage of wholes). He exhibits less daring in the second performance.

While in *"G"* the relationship between imagination and critical intelligence is good, the latter, however, appearing to be stronger. *"H"* seems to show a stronger imagination than his twin (high number of movement answers). In Card VII he solved the problem of the head by using a bonnet. His imagination appears to be less easily disturbed by outside irritations, but he apparently cannot stand too much of it as shown in his more constrictive attitude in the second performance.

CASE STUDY NUMBER FIVE—*"I"* AND *"J"*

Summary. *"I"* and *"J"* are female twins, 13 years of age, of English descent. When tested they were attending the eighth grade in elementary school and their school progress was very satisfactory but not superior. *"J"*'s *IQ* is 104 and *"I"*'s, 93. At graduation, they were chosen to receive the medal given to the "best all-around girl" in the class. They are well liked by the teachers because of their ability to take responsibility. The principal of the school stated that he did not consider them superior intellectually but outstanding in their degree of dependability and initiative. *"J"* was the one recognized as a leader in her class. She appears to be much more able and surpassed her sister in coöperation and understanding in this investigation. *"I"* was hard to approach and even after a year the experimenter was no closer to this subject. There are no other siblings in the home which is of better than average economic status. Most of their time is spent with the mother, the father being employed away from home nine months of each year.

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF *"I"* AND *"J"*

The Rorschach protocols of this pair of twins present more complicated personality pictures for analysis than those of the previously discussed pairs. In the first performance both girls appeared to be predominantly introversial, this pattern being very clear cut in "*I*" (four *M*, six *FM*, and no color) but only suggested in her twin (no real *M*, only *FM*; one *CF* "the sun is setting" which her sister does not have). In "*I*" the presence of movement responses suggests

TABLE 8
PSYCHOGRAMMS "*I*" AND "*J*"

Category of response	First test		Second test	
	"*I*" (21)	"*J*" (21)	"*I*" (17)	"*J*" (25)
W	1	7	4	7
D	12	12	8	12
d	5	0	5	6
dd	3	2	0	0
S	0	0	0	0
M	4	0	4	0
FM	6	8	3	4
m	0	1	0	0
KF	0	0	0	0
FK	1	2	0	0
F	9	7	9	13
c	1	2	1	6
FC	0	0	0	2
CF	0	1	0	0
C	0	0	0	0
ΣC	0	1	0	1
H	3	0	4	0
Hd	4	2	1	2
A	4	8	5	8
Ad	5	2	4	5
A Object	1	3	1	2
Anatomy	0	1	1	1
Nature	0	0	0	0
Geography	0	1	0	1
Architect.	0	1	0	0
Object	1	2	1	6
Plant	0	0	0	0
Spec. group	3	1	0	0
% Original	0	19	0	4
% Popular	5	19	24	12
% Animal	48	48	53	52
$\frac{H + A}{Hd + Ad}$	$\frac{7}{9}$	$\frac{8}{4}$	$\frac{9}{5}$	$\frac{8}{7}$

some development of inner life which is not, however, as yet well integrated (two of the four human figures have the heads cut off). Also in the reaction to color there is evidence of relatively little readiness to participate in things around her. *"I"*'s introversive trend may be accentuated by the puberty situation, which is characterized by an introversial swing in many children and a neglect of relations to the surroundings. *"J,"* on the other hand, seems to have become in the course of development, less introversive than her sister (no *M*) and in the second performance of the Rorschach a swing to the extratensive side may be seen. There is a decrease in form movement responses from eight to four; an increase in texture answers from two to six, and two new attempts at a form-color answer, but the disappearance of the one color-form response. However, the over-emphasis on texture answers (about 25 per cent of all), her avoidance of human beings—the only human things seen being a leg in Card III and a face in Card X—and the artificiality of the form-color solutions create some doubt as to the genuineness of the extroversial swing. It is possible that *"J"* is trying to escape from herself into the extroversial relation. Only further study will show whether she is as basically introverted as her twin. There is another possible explanation. These girls may have been basically ambiequal. The introversive trend which appears in both performances of *"I"* may be due to age rather than typical of the individual personality type. Her responses in the second performance seem to indicate a further retreat into introversion. Her careful avoidance of color may perhaps indicate a running away from the color stimuli and not a genuine introversion. In Card II she sees two women, but emphasizes that they have no heads because the heads are red. In Card IX she picks out only two small details and avoids all color. *"J,"* however, may have been ahead of her sister in development and have practically overcome the introversial trend at the time of the first performance and completely so at the second, exhibiting a definite extroversial swing.

The evidence seems to indicate that both of the girls are within the normal range of intelligence. In *"I"*'s second performance the distribution is typical of an average mind. The percentage of animal answers is at the upper limit of normality, but the relationship of whole figures to figure parts is normal. Although the percentage of second and third grade details in the first performance was too large, the elimination of the third grade details in the second performance suggests the presence of maturation. "I"'s refusal of Card IX in the second performance was a definite improvement over the poor third grade detail responses given in the first performance. Technically, the twins are similar in mental approach in the second performance in that the percentages of first and second grade details are almost the same.

The large number of whole answers given by "J" suggests superiority over her twin in abstract thinking. "I"'s increase in the number of whole answers in the second performance, however, indicate the development of abstract thinking. "J" displays more originality in thinking, but the degree is small even in her. While the quality of the movement and whole answers indicate in "I" a good integration between imagination and thinking—not without friction, however (cut-off heads)—her sister avoided to a much greater degree giving away any of her inner life or employing anything that comes from the inner life. This trend may be connected with the extroversial trend. It is interesting to note the agreement of the Rorschach findings in respect to mental capacity and the Binet *IQ*'s, and also the distribution of psychic energy as seen in the protocols and the difficulties of the examiners in securing satisfactory coöperation from "I."

Conclusion. The results of the Rorschach indicate that both twins were apparently basically introversive but seem to be developing in opposite directions, "I" retreating further into introversion and "J" becoming more extratensive. Their development at the present time differs in both tempo and quality. However, if "I" is able to emerge from this puberty introversion they may become more similar again.

CASE STUDY NUMBER SIX—"*K*" AND "*L*"

Summary. "K" and "L" are boy twins, 11 years of age, attending the sixth grade of the elementary school. Their parents were born in Germany. There are three siblings, a boy and a girl older than the twins and a girl younger. The home is average, the father being regularly employed. The school reports their progress to be average. The *IQ*'s are 98 and 100 respectively. The principal stated that except for one occasion she had never seen the two boys together. "L" is much more social and spends most of his time with other boys of his age, coming and going as he sees fit with little parental supervision. *"K,"* on the other hand, is very shy and spends more time in the home helping the mother with the care of the younger child. The boys appear fond of each other, but have less interest in each other than would be expected of mere siblings. *"L"* is decidedly more aggressive and friendly. Where any inquiries or requests for help were made *"L"* always assumed the responsibility, his twin standing back and permitting it willingly.

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF *"K"* AND *"L"*

Striking dissimilarities in personality make-up in this pair of monozygotic twins are seen in the four Rorschach protocols. The fact that the number of movement answers given by *"K"* remain the same in spite of the decrease of one-third in the total number of answers in the second performance suggests that he has gone beyond the pre-puberty stage of development and into the introversial swing typical of the climax of puberty. The average range of the real puberty process is 12 to 14 years. Even if he used color in those four questionable *FC* responses, it still remains fairly evident that he is predominantly busy with the stimulations from within. Although there is some tendency toward emotional adjustment, as shown by the 4 *c*'s and the questionable 4 *FC*'s, the indefiniteness and uncertainty of the form-color reactions may indicate doubt as to its achievement. The weakness on the extroversial side may perhaps be attributed to his oppositional tendencies as seen in the white space answers, this tendency, however, decreasing in the second performance. In *"L"* evidence can be seen of constriction typical of pre-puberty. However, he appears to be less constricted in relation to his surroundings than he is toward his inner life. The dynamic life-giving functions of the inner life are apparently present as capacities (*FM*) but are rather reluctantly used, this reluctancy increasing in the second performance (ten *FM* in the first, seven *FM* in the second). On the whole *"L"* presents the picture of a well adjusted boy, with occasional impulsive tendencies (seen in the additional *CF* responses). An inclination to use white space as color is seen (snow in Card VIII). The general pattern of personality is the same in the two performances even though it is expressed in different answers. In each performance there appears one texture answer, one form-color, and one additional color-form

TABLE 9

Psychogramms "*K*" and "*L*"

Category of response	First test		Second test	
	"*K*" (37)	"*L*" (22)	"*K*" (26)	"*L*" (20)
W	11	2	7	2
D	19	13	14	9
d	2	6	3	8
dd	1	0	0	0
S	4	1	2	1
M	3	0	3	0
FM	11	10	6	7
m	0	0	3	0
KF	0	0	0	0
FK	0	0	0	0
F	19	10	12	11
c	4	1	2	1
FC	(4?)	1	(4?)	1
CF	0	0	0	0
C	0	0	0	0
ΣC	0	.5	0	.5
H	2	0	1	0
Hd	2	1	2	2
A	14	10	8	7
AD	4	4	3	7
A Object	1	0	1	0
Anatomy	0	0	0	0
Nature	0	0	0	1
Geography	2	4	2	1
Architect.	0	0	0	0
Object	6	3	4	1
Plant	6	0	5	1
Spec. group	0	0	0	0
% Original	8	9	12	15
% Popular	11	27	12	20
% Animal	49	64	42	70
$\frac{H + A}{Hd + Ad}$	$\frac{16}{6}$	$\frac{10}{5}$	$\frac{9}{5}$	$\frac{7}{9}$

response, but all appearing in different cards in the second performance. The constancy of the test is seen not in the repetition of the answers but in repetition of behavior, which is as clearly seen in the seven different answers as in the repeated ones.

The same marked difference is observable in mental approach. In "*L*" there is the careful constricted meticulous approach as evidenced in the percentage of form answers (about 50 per cent) and second grade details as contrasted to "*K*"'s more flexible and versatile approach as seen in the whole answers, movement responses, and the range of content. The one-fifth of the total number of answers which are neither of the animal nor human type show greater variety. "*K*" attempted to recall his former answers but in cases where he did, he used them in interpreting different stimuli. Another indication of his lack of effort in this situation was seen in the fact that all his initial answers are geographical. In spite of this "lazy" attitude he retains his versatility. He shows a tendency to combine and elaborate while his brother simply points out. In "*L*" the increase in the second grade normal details from six to eight goes along with a more static approach as seen in the decrease of form movement answers from ten to seven, instead of a more dynamic one which is typical of "*K*" (*M* and *FM* contribute 14 out of 37 responses in the first performance and 12 out of 26 in the second). Thus "*L*"'s entire performance is typified by a lack of daring. He does not use imagination at all, almost never expressing action tendencies spontaneously but only in the inquiry. He does appear to exhibit a favorable balance between common sense and originality, and it is quite possible that when he is released from his constrictions he will show higher mental capacities. "*K*" makes much greater use of his imagination than does his brother. In the second performance, however, he displayed much more care, eliminating the more daring answers. For example, in Card V in the first performance he gave two responses "*two lions jumping at some one*" and "*two alligator heads.*" In the second performance his response was "*two alligators with open mouths.*"

Conclusion. In this case personality development of each of these twins remains relatively the same over the half year period. The divergency is in tempo of development. The evidence might be interpreted to indicate that the difference may be basic and not due to developmental age, but no conclusion of this kind may be drawn without more testing at a later date.

CASE STUDY NUMBER SEVEN—"*M*" AND "*N*"

Summary. "*M*" and "*N*," only children of Jewish parents, are girl twins, 14 years of age, attending the eighth grade in the elementary school. The family is one of high socio-economic status, the girls receiving all the advantages of a home of this type. The *IQ* of both girls is identical, 101. School progress is average. The mother and father are very intelligent and keenly interested in the vocational and cultural development of the twins. The two girls are rarely seen apart, and neither can be persuaded to carry out any activity without sharing it with her twin. "*M*" appears to be slightly more dominant, making the decisions for the pair in most instances. Both girls, because of the fact that they are twins and very attractive in appearance, have developed a rather superior attitude toward other children, who term them "stuck-up." They spend most of their leisure alone or with their mother and are content without the company of other girls of their age. They have never been separated in school or in their home life.

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF "*M*" AND "*N*"

As was the case with some of the previous pairs, the evidence seems to indicate a basic introversive personality constellation in both of these girls. However, some dilation may be seen in the case of each twin, "*M*" slightly more in the introversial direction (increase in *M* from four to six). In the first performance the four movement answers came in the last two cards. In the second performance, a more favorable distribution can be seen; movement answers appearing in Cards I, III, IV, VII, VIII, and X, where most appropriate. In the form movement answers can be seen a definite shift (two *KF* and nine *FK* in the first performance and only five *FK* in the second) which perhaps indicates a tendency toward crystallization of the activities of the inner life, since the *KF* completely disappear and the more integrated *FK* responses remain in a smaller number. A comparatively good intellectual control is evident now in the percentage of form answers, the majority of which are good ones.

While "*M*" appears to be passing through the introversial swing of puberty as evidenced by the decrease in the second performance on the color side accompanied by an increase in movement, "*N*" appears to be passing directly into the dilated adolescent phase as seen in the increase of color accompanied by increase in movement. Here the evidence suggests a more even development of personality in the strengthening of both color and movement. Although in

TABLE 10
PSYCHOGRAMMS *"M"* AND *"N"*

Category of response	First test		Second test	
	"M" (73)	*"N"* (34)	*"M"* (45)	*"N"* (28)
W	5	0	3	0
D	35	18	24	16
d	13	10	11	6
dd	11	3	2	5
S	9	3	5	1
M	4	0	6	1
FM	9	5	4	6
m	3	1	0	0
KF	2	0	0	0
FK	9	3	5	3
F	42	23	26	15
c	1	1	3	0
FC	2	1	(1?)	(2?)
CF	1	0	0	1
C	0	0	0	0
ΣC	2	.5	.5	2.0
H	7	1	7	1
Hd	12	8	8	7
A	18	11	10	8
Ad	3	1	4	3
A Object	0	0	0	0
Anatomy	4	2	0	2
Nature	12	3	4	2
Geography	9	3	4	2
Architect.	0	0	0	0
Object	5	3	6	1
Plant	0	2	2	1
Spec. group	3	0	0	1
% Original	14	0	11	3
% Popular	10	3	11	7
% Animal	29	35	31	39
H + A	25	12	7	9
Hd + Ad	15	9	12	10

both girls is seen an increased sensitivity in relation to the outer world, *"M"* is strengthening her contact with her surroundings at the same time as development of the inner life is strengthened. (In the first performance one *FC* and in the second two *FC* and one *CF*.) Although the small percentage of answers relating to color as compared to form suggests that in both girls the main approach is through intelligence and not through feeling, at the present time *"N"* seems to be much more open to emotional stimuli than her sister, as evidenced in her color responses. Thus *"M"* appears to have become more introversial—*"N"* seems to be ambiequal.

In mental development, these girls are rather similar. The results point to the fact that both are well within the range of normality. In both, the small number of whole answers and a comparatively high number of second and third grade details suggest that thinking is more concrete and inquisitive than abstract. Although the number of answers has been cut down significantly in the case of *"M"* this reduction has taken place at the expense of the easier answers, the more valuable and selective ones remaining. The relationship between the percentage of popular and original answers suggests a favorable balance between common sense and inventiveness. Both girls are alert and full of ideas, but these are not as yet fully integrated. *"M,"* however, approaches this point in the second performance (seen in the relation of *M* to the sum of the intermediate categories above *F*). While a high degree of versatility is evident in both girls, as seen in the range and type of answers, *"M"*'s imagination is much more vivid than her twin's and she is particularly busy with human problems (human figures, idols, etc.). From the viewpoint of vocational guidance such development of the imagination might well be considered as a factor for success in writing. Upon inquiry, the experimenter learned that this girl *liked to write and draw, both of which she does exceptionally well.* Her twin shows no evidence of such inclinations.

Conclusion. Granting a similar basic personality make-up, here again is seen a divergency both in tempo and quality of development. After *"M"* passes out of the introversive swing of puberty, she may become more like her sister. On the other hand, it is possible that the qualitative differences will be strengthened by environmental factors and thus produce a permanent difference.

CASE STUDY NUMBER EIGHT—*"O"* AND *"P"*

Summary. *"O"* and *"P"* are twin girls of Irish extraction, 11 years of age, attending the sixth grade of an elementary school. Their *IQ*'s are 100 and 106 respectively, and their school progress is average. There are no siblings or other members of the family other than the parents in the home. The school reports that they presented no behavior problem, but they were placed in different sections of the grade because of the principal's belief in the advisability of such action at this age. The teachers report them to be "silly" and "show-offs," especially *"P."* The experimenter found them to be rather attractive normal girls quarreling frequently with each other. *"P"* was difficult to work with at times because of her tendency to exaggerate her good points, talk about herself at the expense of the test, and to affect an artificial manner of boredom most of the time, accompanied by various pains and headaches. These girls spend most of their time together but usually in the company of other children. They show little interest in each other. The mother displays the same childish, "silly" attitude as the two girls.

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF *"O"* AND *"P"*

In both members of this pair there is a more complicated personality pattern with wider spread and more changes within the half year's time than in the majority of cases. *"O"* shows a peculiarly dilated set-up in the first performance (responses in every category) but has apparently been able to consolidate this set-up to some degree, to increase her intellectual control (the increase of form compared with both sides), to restrain her impulsiveness (decrease in *CF* from six to two), and clear up the inner chaos (decrease of *KF* from five to one and the disappearance of *FK*). Thus in the second performance of *"O"* rather constrictive tendencies are evident as well as the need for the development of the whole inner life. *"P,"* on the other hand, while displaying the same basic dilation as her twin, does not succeed so well in balancing her set-up. The data suggest that constriction has taken place. There is a tendency to over-intellectualize the procedure in order to exhibit knowledge and intelligence, and the weakening of the inner life which had been so nicely developed can be seen in the decrease of *M, FM,* and *K.* While the distribution of color reactions suggests a high degree of impulsiveness and egocentricity in both girls, *"O"*'s second performance indicate improvement in control of impulsive tendencies, perhaps due to the fact that the inner chaos seen in the chiaroscuro reactions had been partially cleared up. In *"P"* the evidence suggests an unfavorable development in emotional balance. Whereas six months

TABLE 11
PSYCHOGRAMMS "*O*" AND "*P*"

Category of response	First test		Second test	
	"*O*" (42)	"*P*" (69)	"*O*" (55)	"*P*" 70)
W	1	2	3	3
D	23	35	36	30
d	15	19	7	24
dd	0	12	3	13
S	3	1	6	0
M	1	9	1	3
FM	4	13	12	8
m	3	5	0	3
KF	1	0	1	0
FK	5	4	0	0
F	18	31	35	49
c	3	0	2	4
FC	1	4	2	1
CF	6	3	2	2
C	0	0	0	0
Σ*C*	6	3	3	2.5
H	1	11	2	6
Hd	6	13	7	18
A	6	22	15	13
Ad	8	6	2	11
A Object	3	2	0	1
Anatomy	0	0	0	1
Nature	13	5	9	1
Geography	3	3	14	8
Architect.	0	0	0	1
Object	1	4	3	7
Plant	1	1	0	1
Spec. group	0	2	3	2
% Original	0	0	0	21
% Popular	2	6	2	6
% Animal	33	41	31	34
H + *A*	7	33	17	19
Hd + *Ad*	14	19	9	29

before she had surpassed her twin in this phase of development, emotional balance now lacks the stabilizing support of the inner life (decrease in *M, FM, K*). On the extraversial side there is withdrawal—the form-color suffering more than the color-form reactions. The instability of her relationship to human problems can also be seen in the reversed proportion of whole figures to figure parts.

The *m* or "hung up" answers perhaps indicate a certain neurotic tendency. This latter trend is perhaps confirmed by the inconsistency in her performance. In Card I, for example, she gives all excellent answers, in Card II, all profiles. Her twin (*"O"*) gave all easy geographical answers for the simple reason that they were easy, using them to show off and not to commit herself. *"P"* does not give such numerous and easy ones; the answers she gives show confusion, e.g., *"two islands connected by a canal,"* calling a peninsula an isthmus. Besides the foolish geographical answers there may be a lack of real opposition as seen in the absence of white space answers.

Interesting differences may be observed in the mental development of these twins. The Rorschach data suggest that they are both within the normal range. The distribution of whole answers and details indicates the possible mental superiority of *"O."* However, she shows a lack of originality in thinking; there being no single original answer in either performance. Almost half the answers in the second performance were geography or nature—as easy and superficial as possible. There is evidence of an increased stabilization of mental control after the six months period, seen in the increase of whole and form answers. There is also an optimum relationship between the first and second grade normal details, since it is expected of a child of this age to have about five times as many *D*'s as *d*'s. There is also evidence of combinatorial power, the first performance showing only an inclination, and the second, a decided increase in the number of first grade details and a decrease in second grade. In her use of white space *"O"* shows both common sense and sound opposition, neither of which are evident in her twin. However, "P" does show a more original mind and greater versatility (15 original answers and 4 popular—an unfavorable balance) but little power to combine as seen in the lack of wholes and combinatory first grade normal details. She shows an unfavorable relationship between the first and second grade details—35 to 19 the first time and 30 to 24 the second. In both performances *"P"* has 13 third grade details, her twin only three. In both girls intelligence plays too great a rôle. In *"O"*'s case it leads to superficiality, as seen in the large number of geographical answers. An effort to exhibit her knowledge is seen, such as is observed in adults giving a disproportionately large number of anatomy answers. In the twin's case not only superficiality but confusion can be seen. In both girls the imaginative powers appear to be particularly strong. In *"O"* it is embryonic and chaotic, but the beginning of crystallization may be seen in the second performance. In *"P"* the nine movement answers suggest a remarkably high level for her age. However, in the second performance there appear to be definite indications of a withdrawal and retreat from the whole inner side.

Conclusion. In both girls there was evidence of rather wide dilation and too little integration in the personality set-up. The development appears to have the same direction in the two girls. Both were trying to pull themselves together and achieve a reasonable balance, *"O"* with more success than *"P."*

CASE STUDY NUMBER NINE—*"Q"* AND *"R"*

Summary. *"Q"* and *"R"* are male twins, 11 years of age. These boys are Jewish and come from a superior socio-economic level. They attend sixth grade in the elementary public school. The boys are constant companions, attending the same camp in summer. They seem to enjoy each other's company more than that of outsiders. There is one male sibling attending secondary school. School progress has been normal. Their *IQ*'s are 101 and 100 respectively. The experimenter found the boys to be very similar in personality make-up, based on observation over the period of a year. There did not appear to be any particular signs of leadership or dominance on the part of either one, although *"R"* usually made any plans with the examiner and discussed their activities much more freely and willingly than *"Q."*

COMPARATIVE ANALYSIS OF THE RORSCHACH PROTOCOLS OF *"Q"* AND *"R"*

The typical picture of pre-puberty personality development is seen in this case study. So far as the constriction due to age permits the original personality constellation in "Q" to be seen, it appears to be an almost ambiequal state, the stimuli coming from without being less constricted. In the second performance evidence of an extroversial swing is seen in the texture answer and four color-form responses. There is also shifting in the second performance from impulsiveness (flames, etc.) to well-adjusted reactions (now four colored peacocks and butterflies). On the whole, his brother is

TABLE 12

PSYCHOGRAMMS *"Q"* AND *"R"*

Category of response	First test		Second test	
	"Q" (20)	*"R"* (26)	*"Q"* (23)	*"R"* (22)
W	2	1	2	1
D	14	13	13	9
d	2	11	6	9
dd	0	0	1	0
S	2	1	1	3
M	0	1	0	1
FM	5	1	4	4
m	1	0	0	0
KF	0	1	0	0
FK	1	2	0	0
F	12	15	14	12
c	0	1	1	3
FC	0	5	4	2
CF	1	0	0	0
C	0	0	0	0
Σ*C*	1	2.5	2	1
H	0	1	0	0
Hd	0	2	0	2
A	16	10	16	5
Ad	2	8	4	8
A Object	0	0	0	0
Anatomy	0	0	0	0
Nature	0	0	1	0
Geography	0	0	0	0
Architect.	0	0	0	0
Object	1	2	2	4
Plant	0	2	0	2
Spec. group	1	1	0	1
% *Original*	0	0	0	4
% Popular	0	0	9	18
% Animal	90	69	87	59
H + *A*	16	11	16	5
Hd + *Ad*	2	10	4	10

very similar. However, more dilation of personality is seen in the distribution (two *FK,* one *KF,* and more color). *"R"* has reached the stage of development in the first performance that *"Q"* achieves in the second. In both boys evidence of good emotional adjustment *on a simple level is seen. (quality of the FC answers). The relationship* between the texture answers and color-form responses indicate *"R"*'s somewhat more mature emotional adjustment. His use of color and his checking its accuracy was an interesting difference. These twins demonstrate the peak of repetition in their second performances, *"R"* 22 out of 22; his twin, 16 out of 23, showing perhaps the strenuous matter-of-fact attitude typical of this age.

In both boys a very similar mental approach is also seen. Evidence indicates about average intelligence. The number of whole answers is relatively small in each case. In *"Q"* there appears to be a complete lack of originality and an unusual amount of stereotyping in thinking (90 per cent animal answers). Otherwise the mental ability seemed good as far as common sense is concerned (percentage of *D*). This stereotypy may be exaggerated by the age situation. *"R,"* although very similar in approach to his brother, shows more critical ability as seen in the number of second grade details, and less stereotypy. There is more originality in thinking, but more of an oppositional trend in the second performance. In both boys there is little use of imagination. However, development of the inner life of *"R"* is more mature but still in the pre-puberty stage.

Conclusion. Here are identical twins who are similar in the quality of development and only slightly different in tempo.

CASE STUDY NUMBER TEN—*"S"* AND *"T"*

Summary. *"S"* and *"T"* are twin boys, 13 years of age, attending the eighth grade of elementary school. These boys are attractive, alert Jewish lads, physically very mature for their age. There is one male sibling attending second year high school. The school authorities are very enthusiastic about these boys because of their superior intelligence and quiet manner. They are both exceedingly shy, making it difficult for the experimenter to establish good rapport. *"T"* practically always answered any inquiries, but neither boy gave any spontaneous information. At the time, the writer felt that the intelligence of these two boys had been overrated due to their coöperativeness and quiet studious manner in school. The home stressed the vital importance of school success. The *IQ*'s on the Stanford-Binet were found to be 105 in both cases. They are rarely seen apart, but spend most of their leisure time with other boys of their age.

Comparative Analysis of the Rorschach Protocols of "*S*" and "*T*"

In spite of the difficulties of making any definite diagnosis in regard to personality type during puberty, both members of this pair seem to be basically more introversive than extratensive. The

TABLE 13

Psychogramms "*S*" and "*T*"

Category of response	First test		Second test	
	"*S*" (13)	"*T*" (19)	"*S*" (19)	"*T*" (15)
W	3	9	3	7
D	8	8	15	6
d	0	0	0	0
dd	1	1	0	0
S	1	1	1	2
M	0	3	0	2
FM	5	3	9	2
m	1	0	1	0
KF	0	1	0	0
FK	0	1	0	0
F	6	5	7	6
c	1	3	2	3
FC	0	3	0	2
CF	0	0	0	0
C	0	0	0	0
ΣC	0	1.5	0	1
H	1	3	0	2
Hd	2	1	2	2
A	8	7	14	6
Ad	1	0	1	0
A Object	1	3	2	3
Anatomy	0	0	0	0
Nature	0	2	0	1
Geography	0	1	0	0
Architect.	0	0	0	0
Object	0	0	0	0
Plant	0	2	0	1
Spec. group	0	0	0	0
% Original*	0	0	0	0
% Popular	0	26	26	20
% Animal	69	37	79	40
H + *A*	9	10	14	8
Hd + *Ad*	3	1	3	2

*Very original combinations.

two personality constellations are in different states of development. *"S"* is in the embryonic state of *"T,"* that is, what is only indicated in *"S"* is visible in his twin in an elaborated, dilated form. (Instead of no *M,* five *FM,* and no color, *"T"* gives three *M,* three *FM,* one *KF,* one *FK,* three *FC.*) In *"S"* the prototype of the state of prepuberty appears (Rorschach's coartation), the evident constriction being the easily recognized sign of the "negative phase" with no color or movement answers. It appears, however, that his twin has traversed that stage. A remarkable dilation of psychic energy for his age is evident, the superior personality development typified by a marked increase in maturity and balance. The texture and form-color answers indicate an awareness of situations around him and a degree of adjustment rarely reached before the age of 15 or 16. There is no sign of impulsive reactions, but a high degree of sensitivity to his surroundings (three *c,* three *FC*). His emotional reactions to things going on around him do not have a decisive influence on him, although he is emotionally aware of what is happening (one *c,* two *c*). His omission of any color responses suggests the presence of the negative phase.

In regard to mental capacity, both boys appear to be near the upper limit of the normal range. In spite of the limitations due to age and not to basic personality development, *"S"* shows the typical normal approach. He sees whole answers where it is easy to see them or where there is particular stimulation. The range of content, distribution of different kinds of details, and proportion of whole figures to figure parts indicate good mental flexibility accompanied by a careful approach and a realization of his limitations. In every respect, however, *"T"* is found to be superior. There is a very marked difference in the general richness of mind as seen in the responses in every region. While in *"S"* two-thirds of the answers are animal, *"T"* gave approximately 37 per cent of this type. Although the norms for animal percentage are not reliable for children of this age, it is probably safe to assume that 50 per cent is average. Thus *"S"* exhibits the upper level of stereotypy, his brother, the lower. The latter's inquisitiveness and resourcefulness can be seen in his responses to Card VII. While his twin sees part of a body, an average response, "T" succeeds in fitting in the bottom of the picture in a typical adult manner. (*a*) *"Two people sitting up in bed and these are the bed clothing."* (*b*) *"Two people standing on* *their heads with their feet up in the air and heads resting on pillows."* Superior development in the ability for abstract thinking accompanied by an optimum balance of common sense can be seen clearly. There appears to be no trend toward originality but evidence of good combinatorial ability. While in *"S"* there appears to be considerable indication of an active inner life but little use made of it in his thinking, there being no movement answers in either performance, *"T"* seems to show good integration between his imagination and thinking.

Conclusion. This pair of boys resemble *"K"* and *"L"* in personality development. In the case of *"S"* and *"T,"* however, there is more evidence pointing to a similar basic introversial constellation. These boys changed very little during the half year period, remaining as different as they were in the first performance. Here are seen not only differences in tempo but also in quality—*"S"* being constricted and "T" dilated.

VI. RESULTS OF THE MATCHING EXPERIMENT

In view of the meager amount of accurate scientific data on the degree of twin similarity in personality development and in view, too, of the limitations of the results and conclusions based upon qualitative investigation, the desirability of analyzing the Rorschach results quantitatively was indicated. However, to analyze the test results by the standard correlational method would reveal only the degree of similarity or difference in the separate categories and not similarity in the total personality picture. Previous investigations of the reliability of the test have been subject to the same limitation. The advantage of the method of correct matchings seemed evident since, as Vernon has shown, "it offers a means of comparing complex wholes or Gestalten, in contradistinction to correlational methods which are generally applied only to the comparison of quantitative continua—either uni-dimensional variables or composite constructs of variables (70, p. 1).

COMPOSITION OF THE GROUP

In any investigation in which the experimenter is interested in determining the degree of resemblance in two groups, data on the *amount of variability within the group itself is essential to a sound* interpretation of the results.

Using the variation in *IQ* as an indicator of general heterogeneity, Table 14 shows the composition of the group chosen for this investigation. Groups I and II were composed of the first and second twin of each pair, respectively, their names having been arranged in alphabetical order.

TABLE 14

COMPOSITION OF THE GROUPS IN RESPECT TO INTELLIGENCE

	Total group		Group retested		Terman's study of 905 unselected children (58, p. 242)
	I	II	I	II	
Number	20	20	10	10	905
Mean *IQ*	94.60	96.10	99.70	102.10	100.46
SD of *IQ*	7.80	8.79	3.66	3.03	12.94
Range of *IQ*'s	79-107	79-107	93-107	96-107	56-145

The standard deviations and range indicate the homogeneity of the group in this investigation in comparison with that of Terman's group of unselected children.

Additional evidence of the lack of influence of whatever heterogeneity does result from age or *IQ* is seen in the little change in the correlations when these factcors are partialled out. The inter-twin correlation for total number of responses was .44, with age partialled out .36, with *IQ* partialled out .41. The inter-twin correlation for percentage of original answers was .60, with *IQ* partialled out .59.

STATISTICAL PROCEDURE

The data were analyzed by means of the contingency matching technique advocated by Vernon (70-71). The coefficients of contingency were calculated by means of the following formulae:

$$C = \sqrt{\frac{(St-1)^2}{(t-1)+(St-1)^2}} \qquad \text{Probable error of } C = \frac{0.6745E}{\sqrt{N}}$$

Where

$$E = (t-1)\sqrt{\frac{(St-1)[(t-1)^2+1] + t[(t-1)-(St-1)^2]}{t[(t-1)+(St-1)^2]^3}}$$

Explanation of symbols:

t = the number of elements to be matched
N = the total number of judgments
S = the proportions of the judgments that are correct

APPLICATION OF THE RESULTS TO THE STUDY OF THE RELIABILITY OF THE RORSCHACH TEST

Six judges, experienced in the use of the Rorschach test, were requested to match the psychogramms by both the 5:5 and 10:10 method, of the first and second performances of each of 10 pairs of twins retested after a half year interval.

Sources of unreliability which may affect the contingency coefficients reported in this study are: (*a*) The reliability of the test itself, dependent on the length of the test and the general excellence of the individual items; (*b*) reliability of the scorer, which involves the uncertainties and subjectivity of scoring due to the nature of the test, a factor not present in the standardized objective test; (*c*) variations in the subjects themselves, due to mood at the time of the test, rapport with the experimenter and similar factors not correlated with traits measured by this test;[5] (*d*) reliability of the judges: differences in ability of the judges to observe likenesses, as a result of differences in the degree of experience in interpreting test scores, lack of adequate norms upon which to base judgment and the fact that judgments were based upon tabulations of another scorer.

Table 15 shows the percentage of correct matches and the coefficient of contingency for each judge, as well as the total results of the group of six judges. The probable errors of the contingency coefficients have been omitted since the *PE* applies only when the sampling distribution is normal, as is not the case for these coefficients.

These data would indicate that when the reliability of the Rorschach test is studied by the matching method, the degree of consistency between the two performances of the test is great enough to meet the standard of adequate reliability of a measuring instrument. These results justify the use of the test in this experiment because similarities and differences in personality make-up of the subjects as shown by this method may be legitimately attributed to true differences and not to lack of reliability in the instrument. The results also objectively substantiate the qualitative findings in regard to changes over a half year period in tempo and direction of the developing personalities of these children.

In addition, when X^2 was computed, the result was so much larger than any of the entries in the X^2 tables that it is safe to conclude that the result could not be attributed to chance factors, but to a true relationship existing between the sets of material to be matched.

The experimenter found that in this case the 10:10 procedure may be more appropriate than the more simple 5:5 type.[6] It is legitimate to accept the higher coefficient of contingency since "it is reasonable to assume that '*t*' (the number of elements to be matched) possesses

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[5] Certain variations in test performance might be attributed to the experimenter. In the present situation, however, extreme care was exercised to avoid variations in the administration of the test. Some factors not within conscious control of the examiner, such as facial expressions, may have affected the performance of some of the subjects.

[6] Since *C* cannot exceed .894 when the number of classes is 4 and .949 when the number of classes is 10, the difference between .29 and .40, the two contingency coefficients found in this study, may be due to the coarseness of the scale and does not indicate that the larger number of categories is more useful.

TABLE 15

RESULTS OF THE MATCHING METHOD APPLIED TO THE STUDY OF RELIABILITY OF THE RORSCHACH TEST

	Percentage of matches						Coefficients of contingency	
	10:10 Method			*5:5 Method*				
Judges	Correctly matched	Matched with twin	Incorrectly matched	Correctly matched	Matched with twin	Incorrectly matched	10:10	5:5
I	100	0	0	100	0	0	.95	.895
II	100	0	0	100	0	0	.95	.895
III	100	0	0	100	0	0	.95	.895
IV	90	0	10	90	0	10	.94	.87
V	80	10	10	100	0	0	.92	.895
VI	80	20	0	80	20	0	.92	.92
Total of 6 judges	92			95			.94	.88

an optimum size for each type of material depending mainly upon the number of impressions which the average judge can keep clear in mind" (71, p. 156).

An examination of the errors made in matching the psychogramms of the first and second performances of each twin reveals some interesting facts. Four of the six judges made no errors in the 20 matchings. One judge matched the psychogramm of each twin in two pairs with that of the retest of his twin instead of his own retest. Qualitative analysis of the protocols had shown that one of these pairs of boys was more alike than any of the other four pairs. During the half year between the tests development had been such that the retest of one was apparently more similar to the initial test of the twin than to his own first test.

In Table 16 the results of this investigation have been presented along with available data from previous studies of the reliability of the instrument. The results of the first three experimenters show the correlation coefficients obtained on the separate categories of the test which were subjected to analysis. In the first and second study the average of the coefficients of reliability on all the cate-

TABLE 16

DATA ON THE RELIABILITY OF THE RORSCHACH TEST

Coefficients of reliability for separate categories	Experimenter				Coefficients of contingency for matching whole tests	
	Vernon (73)	Hertz (31)	Kerr (36*a*)	Troup	Troup	
					5:5 Method	10:10 Method
N	90	100	50	20		
Range of r*	.33-74	.60-90	.001-74	.56-82	.88	.94
Mean of r*	.54	.829		.74		
Percentage of Whole Answers	.74	.717	.74	.82		
Percentage of Popular Answers	.64	.495	.61	.77		
Percentage of Movement Answers	.62	.594	.52	.79		
Percentage of Animal Answers	.48	.708	.52	.56		

*Ranges and means presented are based on all the categories used by the respective investigators. Only four of the more objectively defined categories are presented in this table.

gories is presented. The split-half technique was used by Vernon and Hertz, while Kerr based her results upon the correlation between two performances of the test separated by an interval of one year. With the exception of Hertz's results and those of the present study, the reliability of the quantitative scores on separate categories seemed to be low.

The results of the matching experiment indicate that when the degree of resemblance between the two performances is based upon a consideration of the total personality picture as seen in the Rorschach psychogramms, the degree of reliability of the test appears to be significantly greater than the estimates of reliability based upon the average of the correlation coefficients obtained on the separate categories.[7]

APPLICATION OF THE RESULTS TO THE STUDY OF THE DEGREE OF SIMILARITY IN PERSONALITY MAKE-UP OF IDENTICAL TWINS

In contrast to the success of the reliability matching procedure, the results of the inter-twin matchings were neither so striking nor so satisfactory. However, before the inter-twin coefficients of contingency are considered, the inter-twin correlations on the various categories of the Rorschach test are presented along with two reported by Kerr in a recent study (36*a*).

These results suggest a fairly substantial degree of resemblance in twins in the total number of responses given, the length of time required for the test and the percentage of original, animal, and popular responses. In view of the small number of cases, however, the reliability of these correlation coefficients is somewhat doubtful.

The inter-twin coefficients of contingency are presented for each of the six judges and for the entire group by both the 10:10 and 5:5 method.

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[7] The coefficient of contingency is being considered roughly equal to the correlation coefficient, but it should be pointed out that the coefficient of contingency always gives a somewhat lower result, the amount depending on the number of categories used (Garrett, H. E., Statistics in Psychology and Education, New York, Longmans, Green and Company, 1926, p. 200). There are at least two factors which tend to depress the contingency coefficient: (*a*) The upper limit of C is not 1.00; (*b*) the reliability of the judges is an added factor influencing the coefficient of contingency, but not affecting the correlation coefficient.

TABLE 17

INTER-TWIN CORRELATIONS ON THE SEPARATE RORSCHACH CATEGORIES

Catgory	Kerr		Troup	
	r	*PE* of *r*	*r*	*PE* of *r*
Total number of answers			.44	.122
Total time of the test			.47	.118
Percentage of original answers*			.60	.097
Percentage of popular answers	0.16	.092	.34	.133
Number of whole responses	.016	.019	—.29	.138
Percentage of whole responses			.10	.149
Number of movement responses			—.25	.141
Percentage of movement responses			—.11	.149
Number of color responses			.50	.113
Percentage of color responses			.07	.150
Number of human responses			.10	.149
Percentage of human responses			.21	.144
Number of animal responses			—.20	.145
Percentage of animal responses			.51	.111
Average			.18	.0349

*Percentages have been presented to show the emphasis a person gave to certain types rather than gross number of responses.

TABLE 18

INTER-TWIN COEFFICIENTS OF CONTINGENCY

	Matching procedure	
Judge	*C*—10:10	*C*—5:5
I	.32	.66
II	.55	.60
III	.45	.53
IV	—.16	.13
V	.00	—.35
VI	.45	.53
Total group	.29	.40

The results of the inter-twin matchings indicate that the degree of similarity in personality development in identical twins, as shown by the Rorschach test, is not as great as the degree of similarity generally found in respect to intelligence or physical traits in this type of twins; the fairly low order of the inter-twin contingency coefficient suggests the presence of a substantial environmental component in personality development. If the Rorschach responses were as fully determined by heredity, as, for example, eye-color, or height, the inter-twin matching coefficient should be practically as high as the reliability matching coefficient. This is approximately true with *IQ;* both the inter-twin correlations and the repeated reliability of the test are usually .90 or above. In this present study an inter-twin correlation of .81 was found. Although this is not as high as found in other investigations because of the narrow range of talent, there is still a striking degree of correspondence between these identical twins in intelligence. Although data on many more pairs of identical twins and a large group of fraternals would be desirable to confirm our finding, these data and observations of the judges seem to confirm the general conclusion of the qualitative studies in regard to the lack of a high degree of resemblance in personality make-up of identical twins.

In addition, the data suggest that the degree of similarity in the personalities of identical twins is greater when the estimate is based upon the interpretation of the whole personality, than when based upon bits of the personality make-up as seen in the correlation coefficients on the separate Rorschach categories.

In regard to technique, it is evident that, in contradistinction to the procedure in the reliability investigation, the "$t = 10$" procedure is too complex and does not afford a fair basis for conclusion. The "$t = 5$" is a more appropriate procedure. All except one judge succeeded better on the 5:5 matching.

Factors Affecting the Reliability of the Matching Results

There are several limiting factors which became apparent to the experimenter during the investigation and which must be kept in mind in the interpretation of the results. In the first place, success in the matching was dependent upon several factors which affected the comparability of the results of the six judges: experience and skill with the test, a familiarity with psychological twin studies, and more important still, the length of time spent on the matching. Since the judges were requested to complete the reliability matching first, it is quite possible that the wide discrepancy between the success on that task and in the task of matching the two members of a pair may be explained in part by the fact that the length of time spent on the reliability matching prohibited the spending of an equally long period on the more difficult job of matching the psychogramms of the two members of a pair. The greater success on the reliability matchings may also be explained in part by the fact that experience with Rorschach retests would furnish many principles upon which to base judgment. In regard to the effect on success of the degree of skill in interpreting the test results possessed by the judge, it is interesting to note that had the two judges, who were the least experienced with the Rorschach test, been omitted, the average of "$t = 5$" would have been .58 instead of .40. However, no valid basis is offered here for this conclusion, since these judges were not inferior on the reliability matching.

There is another and probably the most important condition affecting the matching results in this investigation—the complexity of the material to be matched. It is rather doubtful if even a very skilled judge can grasp at one time five such involved sets of materials as the Rorschach records plus their interpretations of the total personality picture. It is needless to call attention to the even more difficult 10:10 matching procedure. Vernon suggests that "matching does apply best to relatively simple material like facial expressions and handwriting."[8] He also points out the complexity of the Rorschach material when used in a matching experiment.

The reactions of the various judges to the matching procedure were very interesting. Several reported their methods of attacking the problem. There was unanimous agreement as to the confusion and difficulty experienced in the attempt to match the psychogramms of the members of a pair in contradistinction to the comparatively simple task in the case of the reliability matching. One judge, after trying proportions of various responses, interpretation of the personality make-up, content, style of answering and like procedures, found that the total time of the test, and original and animal percentages, were more hopeful. Human and nature plus architecture percentages also were fairly consistent. He found that the "Erlebnistypus" was often entirely different and found considerable variations in the "Erfassungstypus." Another judge reports that he "was insecure and doubtful in each decision."[9] Another reports a feeling of "absolute blindness" in matching.[9] A fourth observed the lack of any clear principles to facilitate the inter-twin matchings such as he was able to formulate for the matching of the first and second tests. He also reported confusion over some of the cases which differed so greatly from the rest that they seemed to be similar to no other one. He feels that a possible explanation may be "that if one twin deviates from the norm the other might be expected to deviate also from the norm but most probably not in the same direction."[9] He found *M*, as an indicator, helpful in the one series and attributes his better results with this material to that factor.

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[8] As indicated to the writer in a personal letter.

[9] As quoted from personal letters to the writer.

It may be concluded, then, that there is some doubt as to the applicability of the matching technique to the Rorschach data in the study of the degree of twin similarity, because of the complexity of the material and the large number of other factors influencing success.

VII. A SUMMARY OF THE EXPERIMENTAL PROCEDURE, RESULTS, AND CONCLUSIONS

PROCEDURE

In studying the degree of similarity in personality development in identical twins, 20 pairs of twins of this type who were attending the sixth, seventh, and eighth grades in elementary school in Buffalo were chosen as subjects. The determination of hereditary similarity was based upon D. C. Rife's diagnostic formula which includes eight criteria of monozygosity. Two additional selective factors influencing choice were intelligence level and coöperation of the subjects, parents, and school authorities.

An extensive battery of personality tests was administered to the 40 children. With the exception of the Rorschach test and samples of handwriting, all the tests were of the objective pencil and paper variety. A preliminary analysis of the data indicated clearly the limitations of many of the proposed measures in contributing to the solution of the problem; many of these limitations are inherent in the quantitative approach to the study of personality. The Rorschach Ink-blot Test was retained as the experimental instrument, since it seemed to afford insight into the fundamental similarities and differences in the whole personality make-up of the subjects.

Comparative qualitative analyses of the protocols of 10 of the 20 pairs who had been retested after a half-year period were made. Not only were the similarities and differences in personality development at the time of the first test noted, but the data of the retests furnished an opportunity to study the trend in development over the period intervening between the tests. In addition, these data furnished an opportunity to study the reliability of the method. Analyses of the protocols were made with a knowledge of age, grade, and nationality of the subjects, but with no knowledge of their social histories. The administration and scoring were done by the experimenter according to a refined scoring method.

In the quantitative study of the degree of similarity in temperament of identical twins and also in the investigation of the reliability of the test, Vernon's method of correct matchings was employed. While the qualitative analyses gave no numerical index of the degree of similarity of the two members of a pair, the matching method afforded a means of comparing the total personality picture of one member of a pair with that of the other, and the qualitative results could be subjected to quantitative analysis.

Six judges, experts in the use of this test, were requested to match, first, the two performances of each of the 20 individuals. In this case only the psychogramms were offered because of the obvious factor of identical answers. The judges were then requested to match the psychogramms of the two members of each pair. Here the protocols were included in order that the judges might have a complete picture of the total personality make-up of each twin. This task required not only familiarity and skill in the interpretation of the test results, but also unlimited time and patience.

The inter-twin and reliability matchings were first made according to the 10:10 procedure. After these results were recorded the process was repeated using the 5:5 procedure, in accordance with the directions in the semi-key.

In the statistical analysis of the data the contingency matching technique, advocated by Vernon, was used. Inter-twin correlations were calculated for some of the Rorschach categories by means of the Pearson Product Moment formula.

RESULTS OF THE QUALITATIVE ANALYSES

Although the comparative analysis of the protocols of the 10 pairs of twins yielded no single numerical index of the degree of similarity in personality development, careful comparison of the total personality pictures of the members of each pair indicated in general no high degree of resemblance in temperament. In fact, the utter lack of resemblance in some of the pairs made it impossible to identify them as twins.

In this phase of the study the experimenter was interested in investigating how the twins differed or were similar. Examination of the protocols seemed to indicate that these twins differed in three phases of personality development; (*a*) in the tempo, (*b*) in the quality, (*c*) in the direction which the development appears to be taking. While the analysis of a single Rorschach indicated only the state of development at the time the test was given, the results of the repeated tests did furnish some indications as to trends in development.

As far as it was possible to differentiate the basic personality constellation because of the influence of age on the Rorschach scores, apparently all the pairs showed a basically similar set-up. With the exception of *"Q"* and *"R"* none of the twins showed evidence of a closely similar development. Both *"Q"* and *"R,"* however, were apparently in the pre-puberty stage of development and showed only a very slight difference in tempo and a close similarity in quality and direction of development.

Difference in tempo of development accompanied by a *similarity* in quality and direction may be seen in *"K"* and *"L."* The data suggested very little change in either boy over the half-year period, each remaining as different from his twin as they were in the first performance. *"L"* apparently remained in the pre-puberty stage of development while the performances of his twin suggested that he had passed that stage, showing the signs of the interversial swing of puberty power.

Wide dissimilarity in quality accompanied by apparent similarity in direction and tempo may be observed in two pairs of girl twins, *"A"* and *"B,"* and *"O"* and *"P."* While in *"A"* the results suggested a strong introversial tendency accompanied by evidences of anxiety, her twin's performances indicated that the introversial urges were much less strong and evidence of less of an anxiety attitude was seen. In *"O"* and *"P"* were seen more complicated patterns of personality than in any of the other pairs of twins. While *"O,"* in her second performance, appeared to be able to pull herself together and secure better integration and emotional balance in her personality set-up, *"P"* showed an enormous amount of constriction and a weakening of the inner life which appeared to have been so neatly developed at the time of the first performance; the constriction was accompanied by an unfavorable change in emotional balance with indications of neurotic tendencies.

In four pairs of twins evidence of dissimilarity both in quality and tempo may be seen. *"C"* apparently remained in the pre-puberty period after the half-year and his performance suggested little indication of maturation. In *"D,"* on the other hand, there was evidence of an ambiequal state with definite signs of maturation. In *"I"* and and *"J"* the picture was not so clear-cut. As far as it was possible to determine, *"I"* appeared to be in the introversial swing of puberty at the time of her second performance while *"J"* appeared to have partially passed that stage of development at the time of the first performance and completely so at the time of the second. If *"I"* frees herself from this age introversion, the two girls will probably become more alike at a later time. If she goes more deeply into it, the differences in quality of development will be increased. In *"M"* and *"N"* similar personality patterns are seen. While *"M"*'s performances suggested that she was still involved in the introversial swing typical of the climax of puberty, her twin appeared to have passed her sister in development as seen in the evidence of dilation and the development of an ambiequal set-up. It is possible that this divergency in tempo and quality may lead to a permanent difference in quality of development. In *"S"* and *"T"* a similar development to *"K"* and *"L"* may be seen. Like *"K"* and *"L"* little dissimilarity was evident. However, the personality constellations of the two boys appeared to be in different stages of development, *"S"* in the constricted stage of pre-puberty and *"T"* exhibiting a remarkable dilation and a marked degree of maturity. Little change was apparent in either boy over the half-year period.

In *"E"* and *"F,"* and *"G"* and *"H"* there was evidence of a different trend in development than in the other pairs. There may be seen a difference in direction. In the first performance of *"E"* and *"F"* they appeared rather widely different, a much greater degree of constriction being evident in *"F"* suggesting a difference in quality of development. However, in the second performance, the dissimilarity in personality pattern seemed to decrease and the girls appeared to become more alike. *"F"*'s neurotic tendencies may lead, however, to greater dissimilarity during the later course of development. In *"G"* and *"H"* development seemed to be proceeding in opposite directions at the time of the second performance. *"G"* seemed to be carefully dilating his set-up which was inwardly less well developed than his twin in the first performance, while *"H"* developed a constricted attitude toward a richer inner life without developing the extroversial side. Actually these two boys appeared more alike in the second performance, but this superficial similarity was the result of an opposite trend.

These twin studies indicate one striking fact: How widely different two people with basically similar personality make-up can become in the course of development. The subjects for this investigation were pairs of twins whose heritage is closely similar and whose environment is similar in respect to the major environmental factors such as home, school, etc. Yet these wide differences in personality development were observable. The evidence from these qualitative studies not only indicates no high degree of similarity in personality development, but also destroys any rigid concept of environment and draws attention to the importance of those subtle environmental influences in the molding of personality.

APPLICATION OF THE RESULTS TO THE STUDY OF THE RELIABILITY OF THE RORSCHACH TEST

The reliability of the Rorschach technique was investigated by means of the matching method. When six judges matched the psychogramms of the first and second performance of each member of 10 pairs of twins, a coefficient of contingency of +.94 was found. This result indicated the consistency of the measuring instrument and the justification for its use in this study, since similarities and differences in personality make-up of the subjects as shown by this test may be legitimately attributed to true differences and not to the lack of reliability in the instrument. In addition, the qualitative findings in regard to changes within the half-year period in tempo and direction of the developing personalities of the subjects may also be attributed to true differences and not to the unreliability of the test.

Although much more experimentation is necessary to confirm this point, the data suggests that when the degree of resemblance between the two performances of the test is based upon a consideration of the total personality picture, the degree of reliability appears to be significantly greater than estimates of reliability based upon bits of it as seen in the correlation coefficients of the separate categories. The matching procedure in which 10 psychogramms of the first performance were matched with 10 of the second yielded a higher coefficient of contingency than the 5:5 method.

APPLICATION OF THE RESULTS TO THE STUDY OF THE DEGREE OF SIMILARITY IN PERSONALITY MAKE-UP OF IDENTICAL TWINS

When the degree of resemblance in personality development in identical twins, as seen in the Rorschach test, was determined by means of the matching method, the coefficients of contingency were .29 when the 10:10 method was used and .40 when the 5:5 method was employed.

The fairly low inter-twin contingency coefficient of .40 suggests the presence of a substantial environmental component in personality development. If the Rorschach responses were as fully determined by heredity as physical traits such as eye-color and height, the inter-twin contingency coefficients should be practically as high as the reliability. This is approximately true of *IQ;* both the inter-twin correlations and the repeated reliability of the test are usually .90 or above. However, data on many more pairs of identical twins and a large group of fraternal twins is necessary to confirm this tentative conclusion.

The results of the inter-twin matchings and the observations of the judges confirm the general conclusion of the qualitative study in regard to the lack of a high degree of similarity in personality make-up of these identical twins.

As was seen in the reliability matching procedure, the results of the inter-twin matchings suggest that the degree of similarity in personality development of monozygotic twins is greater when the estimate is based upon the interpretation of the whole personality constellation, than when based on isolated aspects as seen in the correlation coefficients on the separate categories. Here again, many additional data are necessary to establish this conclusion.

The inter-twin coefficients of correlation on the separate Rorschach categories indicate a fairly substantial degree of resemblance between identical twins in the total number of responses given, length of time required for the test, and the percentage of animal, original, and popular answers. However, in view of the small number of cases the reliability of these coefficients is somewhat doubtful.

There is some doubt as to the applicability of the matching method to the Rorschach data in the study of the degree of twin similarity, because of the many factors affecting the possibility of success in matching. Some of these factors are: the length of time spent on the task, the skill and experience of the judge, and the complexity of the material to be matched.

PRACTICAL IMPLICATIONS OF THE STUDY

The results of the qualitative analyses seem to confirm the opinion of many investigators as to the value of the Rorschach test as a method of psychodiagnosis in the field of child guidance. For that reason the detailed case studies have been presented for those readers who are interested in the application of the method to clinical practice. This experimenter found the test helpful, not only because it furnished a picture of the general stage of personality development at the time the test was given, but also because underlying mechanisms of personality were revealed which perhaps were not observable by means of other diagnostic tools. A good example of this is the evidence of anxiety seen in the Rorschach protocols of *"A,"* an observation which later checked closely with the findings in the social history. In the case of problem children referred to a clinic the presence of complexes are often seen in the content of the Rorschach response. The test is also helpful in serving as a general check on the results of the Binet and other quantitative estimates of intelligence, and often furnishes additional qualitative data on the mental make-up of an individual. In cases where there is an obvious discrepancy between mental capacity and efficiency the test often throws light upon the factors underlying this discrepancy. Thus the method furnishes an opportunity for the incorporation of qualitative subjective interpretation—the lack of which has been keenly felt by many psychometricians—into the objective approach typical of the present psychological study of the individual.

A contribution of this study which may prove useful to the clinician is that of the value of repeated tests. In addition to the personality picture furnished by a single Rorschach protocol, the repetition of the test after a period of six months or a year gives a broader view of the constantly changing and developing personality of the subject. Thus this retest procedure should be of value in studying the direction of personality development and the effect of various environmental factors in producing change.

It is true that the method has limitations as far as validity, reliability, and adequate norms are concerned and that the value of the method as a psychodiagnostic instrument depends in large measure on the skill of the examiner. However, these limitations need not handicap its use, since its purpose is not to take the place of objective tests or other clinical methods but to supplement and clarify their results. The value of the method lies in its usefulness in confirming results of tests, observations, case histories, and interviews; as a check on previous findings and the discovery of new "leads" which may suggest an explanation of behavior hitherto unexplained by the other diagnostic methods. Valuable additional information for the psychiatric interview is thus available. In the opinion of the writer, the value of the information gained from the Rorschach test is more than commensurate with the time spent in giving, scoring and interpreting it, and it may well be included in the psychological study of clinical cases.

SUGGESTIONS FOR FURTHER RESEARCH

In the development of the Rorschach method into a more useful clinical tool for the study of personality the experimenter is faced with many stimulating research problems. The results of this study indicate definite fields for future research both in the problem of personality development and in the application and improvement of the method.

From the qualitative viewpoint the availability of the subjects makes possible the continued study of the development of personality patterns in these children, as seen in the Rorschach test. Do they grow more alike as they pass out of the adolescent phase into adulthood or do they grow more dissimilar? By repeated tests the trend of personality development could be clearly seen. The retest results would also confirm or disprove predictions made at this time as to probable direction of development.

The results of this study, supplemented by additional cases, can furnish supplementary information on which to base norms for different age groups.

In order to complete the study of the relative effect of environmental influences on personality development as seen in the Rorschach test, the same experimental procedure should be employed with a group of fraternal twins and siblings in order to furnish a basis of comparison. Until that procedure is carried out, no more definite conclusion as to the potency of environment in the molding and development of personality may be made.

APPENDIX

SCORING SYMBOLS (38)

Symbols	Description and explanation	Interpretative value
W = *whole*		
D = first grade *normal detail*		
d = second grade normal detail		
dd = third grade normal detail		
S = White space	Rorschach's "*Dzw*-Zwischenformen."	
s = small white space *detail*		
M = movement	Rorschach's "*B*-Bewegung." Designates various activities of human or *human-like figures.*	Indicates activity of inner life in the realm of imagination or *intuition.*
FM = form tending toward movement	Rorschach's "*F* zu *B* tendierend." Designates action of animals.	Indicates a normal stage in the growth of inner life not yet fully developed.
m = minor movement	Designates: 1. expressive qualities in *Hd* and *Ad* as grinning face, peering eyes, pointing finger or arm, *legs sticking out, etc.*; 2. passive happenings as explosions, collisions, suspended, falling and whirling objects.	Indicates an under development or repression of inner life.
K = chiaroscuro	Designates a tendency to dissolve the two dimensional ink-blots because of the shading therein. Thus a blot represents not only a tri-dimensional plastic object but a multitude of things spread out in the air-filled space full of light and shade. The main emphasis may be on: 1. the haziness of clouds, smoke, fire (unless this response is stimulated by red color); 2. the perspective (Weil's "long vision response") as landscapes and architectural settings (parts of buildings are usually *F*); 3. the light, shadows or darkness. *K* is frequently combined with *m* *as spouting water,* fountains and streaming lava.	Indicates embryonic or chaotic state of the inner life.
F = form	Rorschach's "*F*-Form." Designates outlines and plastic forms. Maps and X-rays are also usually *F*.	Indicates conscious controlled reactions, over-emphasized in pure outline responses.
c = Texture Coloring	Designates the surface texture of an object as animal skins and fur coats. Small *c* and *K* are rarely combined in one response. Sometimes the texture as well as the color or *form is emphasized, as batik* design (*Cc*) or scotty dogs (*Fc*).	Indicates a cautious approach to happenings around them, resulting in shyness when the sum of *C* *c*, or tactfulness when *C* *c*.

SCORING SYMBOLS (38) (*continued*)

Symbols	Description and explanation	Interpretative value
FC	Rorschach's "*FFb*—Form-Farbe." Designates the use of color in answers where the figure seen in the blot naturally has the same color as the blot itself. Other interpretations where the color is artificially connected with forms, as, for instance, in anatomical drawings where the color only indicates different parts of the drawing without a meaning of itself, may be designated by the symbols *F/C*.	Indicates adjusted feeling but in *F/C* suggests conventional or superficial feeling.
CF	Rorschach's "*FbF*—Farbe-Form." Designates that the answer is primarily stimulated by the color and would be impossible without it. The form *F* may be more or less neglected but must be taken into account, at least with regard to the position of the blot.	Indicates impulsive or ego-centric feeling.
C	Rorschach's "*Fb*—Farbe." Designates that color is the only discernible stimulus. These pure *C* reactions must be carefully distinguished from *C* denominations or enumerations or *C* description of an aesthetic nature as well as from remarks about *C* not intended to be responses.	Indicates explosive feeling or a helpless exposure to emotional stimuli.
C	Designates the numeral value of all color responses.	Indicates a general readiness to respond to stimuli from without.
	Content Abbreviations The only new symbol here introduced is that of A Object, which means animal object, referring to objects made of animal parts such as fur rugs, fur coats, animal skulls, etc., as distinguished from parts of living animals, *Ad*. Likewise *Hd* is reserved only for parts of living human beings and are to be distinguished from anatomical answers, *At*.	

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INDIVIDUAL DIFFERENCES IN THE FACIAL EXPRESSIVE BEHAVIOR OF PRESCHOOL CHILDREN: A STUDY BY THE TIME-SAMPLING METHOD*

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1938

CARLA SWAN

Clinic of Child Development, Yale University

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CARLA SWAN

2555 SOUTH SHERIDAN BOULEVARD
DENVER, COLORADO

I. INTRODUCTION TO THE PRESENT PROBLEM

"The study of facial expression is probably as old as the human race. From the earliest times, men have read in the changes of countenance produced by the movements of the facial muscles, the thoughts, feelings and motives of their fellows" (79, p. 325). The present study attempts to determine whether or not short time-samples of the facial expressions of preschool children offer efficient, reliable, and valid means of determining individual differences.

During the last ten years, the facial behavior of infants and preschool children has been used in controlled studies as a measure of personality development. Various techniques, procedures, and controls have been employed in these investigations. Diaries and stenographic accounts of single children proved to be fruitful, but difficult to analyze statistically with these techniques. Large groups could not be studied adequately, and sex and developmental norms could not be established. Recently, therefore, the method of time-sampling has been attempted as a means of studying larger groups, and determining norms. In the early experimentation with time-sampling methods, investigators used different time units and total periods of observation; differently defined categories, techniques, devices, procedures, and analyses. A survey of the changes and the investigators responsible for each change is too long and complicated even to outline here. Furthermore, they have been clearly reviewed by Bott (19), Goodenough and Anderson (58), Murphy and Murphy (90), and Olson and Cunningham (96), who give excellent summaries of the various techniques, methods, and procedures which have been employed in social studies.

Aside from the methodological aspects, the problem of facial expressions has been approached mainly from two points of view.

In the first place, there have been studies in which the emphasis was placed upon *group characteristic behavior*. Social and material environmental factors were analyzed, in an attempt to establish norms; and age, sex, intelligence, number of school contacts, socio-economic background, and other relationships with group traits were studied. In addition, in order to give a complete picture of the child, many of these authors also attempted to record the aspects of each child's personality which were more individually expressed and which seemed to be less influenced by the factors above mentioned, such as smiling, laughing, talking, and crying. In some cases these expressive items were recorded quantitatively but only incidentally, and, therefore, not analyzed statistically in the results. A few of the investigations, wherein the expressive behavior categories have been observed incidentally with other activities or reactions, have yielded results which are sufficiently reliable to use for age or sex norms, or for comparative purposes in their respective lists of expressive categories. The items of expressive behavior in many of the studies such as Arrington's (6), Bott's (20), Bridges' (24, 26, 27, 28), Goodenough's (56), and Shirley's (108), have proved capable of differentiating individuals. Of these, Bott's study is the only one which attempts a full and comprehensive analysis of the entire list of expressive behavior patterns. In her observations, however, emphasis was placed upon so many categories that the expressive items themselves could not receive as much emphasis as in a study in which they would be the main items under consideration. Furthermore, the mass of information required for each child and the large time until employed caused infrequent occurrences of many of the expressive behavior items and the consequent lowering of the reliability, making individual consistency analyses utterly impossible. Therefore, although each child receives some attention as an indivdual, for the most part such cross sectional group-studies emphasize social rather than the individual characteristics, and estabish group-age, sex, and other norms. Furthermore, they are incapable of accurately determining the infrequently occurring forms of behavior. Extensive individual differences must necessarily be masked in these group analyses.

The following is a list of the facial expressive behavior categories used by those investigators who have observed and recorded, either quantitatively or qualitatively, combinations of facial expressive behavior along with the more social behavior categories:

a. Language, talking, or vocalization: Abt* (1), Beaver* (11), Bowley* (21), Bridges* (27, 28), Kohler* (76), Lewis* (85), Rugg, Kreuger, and Sondergaard* (105), Van Alstyne* (117, 118), Wagoner (119), Waring* (121).

b. Talking (spontaneous or in response) to adults or children, or solitary: Bott, Blatz, Chant and Bott* (18).

c. Talking (spontaneous or in response) to adults or children, or solitary and expressive vocalization: Washburn* (123).

d. Talking and singing: Smith (111).

e. Talkativeness and laughing: Goodenough* (56).

f. Talking, laughing, and crying: Arrington* (6), Jersild* (65), Thomas, Loomis and Arrington* (116).

g. Vocalizing, smiling, gurgling, and smacking lips: Kelting° (71).

h. Language frequency, laughing, mood (cheerful, singing, smiling vs. gloomy, apprehensive), crying: Manwell and Mengert* (64), Shirley°* (108).

i. Talking to self and others, smiling, laughing, pouting, sulking, and total automatisms: Koch* (74).

j. Verbalization, random vocalization, soliloquizing, screaming, shouting, squealing, whistling, laughter, smiles, crying, whimpering, coughing, sneezing, sighing, whispering, mumbling, tics (sucking thumbs or fingers, handling nose, face or lips, moving or holding head, rubbing eyes, making faces, pulling or scratching ears, spitting, yawning, playing with hair, licking spoon, sucking bars, things in mouth): Bott* (20).

k. Laughter: Challman* (32).

l. Smiling and laughing: Jones° (68).

m. Smiling, laughing, inactivity, moves mouth, moves face, sings, facial gestures, frowning, crying, shouting, and indefinite emotional expressions: Reckless and Smith* (101).

n. Angry facial expressions, crying, screaming, fussing, scolding: Recketts* (64).

o. General expressive behavior: Lewin* (84), Conrad* (35), Portenier (100).

p. Spontaneity and expression: Walsh* (120), Gesell and Lord* (54).

Note: * Indicates that the subjects observed were preschool children.
° Indicates that the subjects observed were infants younger than two years of age.

The second type of controlled studies of personality development in preschool children has been the observation and recording of a few specific expressive behavior characteristics of a group of such children. Many observations have been carried on over a period of years on the same group. The authors of such investigations, realizing the difficulties involved in attempting to observe individual characteristics at one time with socio-material aspects of children's behavior, have undertaken to isolate for specific study single traits or combinations of traits in order to check the reliability of the observational technique in studying such traits; to find relationships, if any, between these and other factors such as age and sex; and finally to see if the results of their investigations were capable of differentiating individuals. These studies, however, present very different groups of behavior items for consideration, with conflicting definitions for each item of expression; and not a single one checks individual consistency from observation to observation in any one kind of behavior. Their results, though isolated in character, were nevertheless, in most cases, stated quantitatively so that age and sex norms and intercorrelation coefficients of various kinds are available for comparison with the results of the present investigation. Individual differences, even in these studies, were merely suggested, and emphasis was placed almost entirely upon the group analyses.

The following is a list of the special traits or expressive behavior items which have been observed and recorded quantitatively, and authors who employed them:

a. Language or talkativeness: Adams* (2), Ellesor* (43), Fisher* (47), McCarthy* (87, 88), Piaget* (99), Robinson and Conrad* (104), Schubart* (107), Stalnaker* (113).

b. Gestures: Schäfer (106), Krout (77).

c. Gestures, laughing, smiling, pouting and talking, squealing, sticking tongue out, grimacing: Hosic* (63).

d. Nervous habits: Koch* (73), Olson (93, 94, 95), Ringland* (102).

e. Smiling: Dumas (42).

f. Laughing: Bernadini (13), Enders* (44).

g. Laughing and smiling: Dearborn (37), Ding and Jersild° (38), Gregg* (115), Washburn° (124).

h. Laughing, smiling, talking: Justin* (69).

i. Laughing, smiling, crying: Watson* (126).

j. Laughing, crying, talking: Brackett* (22).

k. Laughing, smiling, annoyed expression, neutral: Smith* (112).

l. Audible expressions of pleasure, distinct smile, faint smile, audible expressions of rage or grief, distinct frown, slight frown, neutral: Lee* (83).

m. Crying and facial expressions: Sherman° (109, 110), Blatz* (15).

n. Crying, facial expressions, smiling, cooing: Bayley° (9).

o. Crying, smiling, finger sucking, face scratching, nervous tics: Bonham and Sargent°* (16).

p. Expressions of depression or introversion (tearful crying, rigid tension, fretful whining, grunting) and elation or extroversion (laughing, smiling, crooning, vocalization): Etziony* (45), Bridges° (26), Bridges* (25), Buchner° (29).

q. Expressions of depression or introversion (tearful crying, rigid tension, fretful whining, grunting) and elation or extroversion (laughing, smiling, crooning, vocalization), thumbsucking: Bridges° (24), Perkins* (98).

r. Humming, singing, chanting: Jersild and Bienstock* (66).

s. Facial expressions and qualitative vocalization differences in general: Darwin (36), Yerkes (132), *Goodenough* (55).

Note: * Indicates that the subjects observed were preschool children.
° Indicates that the subjects observed were infants younger than two years of age.

It is obvious from the two foregoing lists, that practically every facial expressive behavior form has been recorded in the past either quantitatively or qualitatively on preschool children. In many of these studies the time-sampling method was employed, group norms were established, and individual variations were noted coincidentally, but in none was the emphasis placed directly on these individual differences. The present author, therefore, was interested in undertaking an exploratory study on a small group of preschool children emphasizing the differences between individuals by comparing samples of each child's behavior with established group norms. In this investigation the time-sampling technique was employed as an objective means of expressing these differences. Since the value of such a technique depends upon its reliability and validity, sections of this study are reserved to determine these important factors. For the most part, however, interest is focussed entirely upon the incidence of each expressive behavior in each individual rather than upon causal or explanatory relationships. And, for the sake of argument, it will be assumed that each member of a controlled social group will be influenced individually by both his innate personality make-up and by the effect of the culture of his group. However, to what extent these two variables make his expressive behavior differ from that of other members of the group is immaterial in this investigation.

In the present study the facial expressions of 25 preschool children were observed over a period of six months. The social aspects of behavior (such as playing with children or alone), were not included as items to be studied, since by so doing, all observations would necessarily have to be limited to controlled social situations. The items of facial expressive behavior were chosen because facial expressions are individual personality characteristics and occur in all situations. Therefore, it seems justifiable to check the validity of the time-sample by comparing the objective results determined from brief observations made in the experimental situation with general descriptions of each child's expressive type as found in the clinical case histories, nursery records, and rankings made by two judges well acquainted with the children. In this way each subject's behavior adjustment to the social situation, to routine, to new situations, or to his home environment could be compared with the small sample of his behavior in the fairly controlled social situation of the nursery group.

Furthermore, such an extensive study of so few individuals has three distinct advantages. In the first place, new methods of analyzing results of observations may be suggested which might prove satisfactory in more controlled studies and in clinical work. In the second place, certain relationships may be suggested; such as between expressive types and difficulties in adjusting to physical and social environment; between inconistency in behavior and variability in health, environment, and problem tendencies; between choice of play material and and types of facial expressive behavior; and between those items of behavior which may be modified by contact with the social group, and those which seem to be more innate and are maintained consistently by each individual throughout a period of time. Finally, it should be possible to make evaluations and suggestions concerning the validity and clinical efficiency in the use of the time-sampling technique in the study of individual differences.

II. PROCEDURE

A. SUBJECTS

The subjects used in this investigation were 25 children, 15 boys and 10 girls, between the ages of 27 and 49 months (see Table 1). Fourteen of the group were observed during the school year 1934-35, and 11 in 1935-36. The fathers of the majority of the 25 were members of the professional class, and the children may be considered as a homogenous rather than as a representative sample. They were also better than average with respect to mental age and developmental ratio. Whereas the mean chronological age for the group was 37 months, the mean mental age was approximately 42 months, and the mean developmental ratio about 116. Physical measurements taken on each child near the mid-point of the interval of observation indicated that as a group they were also above the average in height and weight for children of the same age and sex.

The nursery situation at the Clinic presented unique opportunities for a study of this type. All of the children had extensive case histories and records with which to correlate the results of the study in hand. Though the number of contacts varied for each child, every subject as a member of the nursery group was present a sufficient number of times to insure monthly observations over an adequate period of time. Furthermore, 10 of the children had been chosen by the nursery clinician at the first of the year to form the nucleus of the group because they were considered to be stable individuals. These are designated as "regulars" in Table 1. The rest of the children entered the nursery group at varying intervals during the year on the "prescription" basis because of adjustment difficulties. Though adjustment difficulties arose among the more stable individuals, they were not as frequent as among the members of the "prescription" group. This differentiation of the children into two groups was maintained in this study because it was thought that it might be possible to investigate, in a purely exploratory manner, the relationship between problem tendencies and the observed facial expressive behavior. But in a group as small as this no attempt could be made to compare directly or statistically the expressive behavior characteristics of the "regular" and the "prescription" groups. However, later, individual studies and comparisons will be inserted (see Sections III and V) to emphasize the relationship between disturbing factors (such as health and poor home or nursery adjustment), and

TABLE 1

SUBJECTS RANKED NUMERICALLY ACCORDING TO GROUP NUMBER, POSITION IN THE GROUP, NUMBER OF CONTACTS, SEX, CHRONOLOGICAL AGE, AGE AT LAST DEVELOPMENTAL EXAMINATION, MENTAL AGE, DEVELOPMENTAL RATIO, HEIGHT, WEIGHT, AND HEIGHT-WEIGHT RATIOS, AND INDICIES

1. Number 1 designates children in the 1934-1935 group. Number 2 designates children in the 1935-1936 group.
2. "R" designates those children who were chosen to be members of the regular group. "P" designates those children who entered the group on a prescription basis.
3. Chronological age as of first observation.
4. Chronological age at the developmental examination nearest the midpoint of the interval of observation.
5. From Merrill Palmer norms (130) pp. 83-84.
6. "K" = $\frac{1000}{2.2 \times (2.54)^2}$. To convert pounds-inches to grams-centimeters.
7. From Merrill Palmer norms (130) pp. 83-84.

* Interpolated figures.

	1	2			3	4						5	7
Children numbered according to Chronological Age	Group Number	Position in Group	Number of Contacts	Sex	C.A. in Months	C.A. in Months	M.A. in Months	Developmental Ratio (approximated)	Height in Inches	Weight in Pounds	Weight/Height	$\frac{\text{Weight}}{(\text{Height})^2}$ x a constant "K"⁶	Weight/Normal Weight (for Height)
I	1	R	31	M	49	54	66	138	40.8	41.75	1.023	1.79	1.118
II	1	P	82	M	49	51	61	105	43.8	44.75	1.021	1.66	1.070
III	2	P	14	M	49	52	65	130	39.7	34.25	.862	1.55	.961
IV	1	P	14	F	47	45	42	100	40.0	41.00	1.025	1.65	1.148
V	1	R	92	F	46	48	70	148	44.5	47.00	1.056	1.69	1.073*
VI	2	P	17	M	45	44	41	93	39.6	38.25	.965	1.74	1.074
VII	2	R	57	M	44	46	57	138	37.4	31.75	.848	1.61	.958
VIII	2	R	13	M	43	39	45	125	38.1	34.25	.898	1.66	1.028
IX	1	P	40	M	42	49	57	118	42.2	43.25	1.024	1.73	1.178
X	1	P	38	F	42	43	42	98	41.2	40.00	.970	1.68	1.063
XI	1	P	92	M	41	39	45	118	41.0	40.75	.993	1.75	1.080
XII	2	R	88	F	41	37	45	120	39.3	38.50	.979	1.78	1.112
XIII	1	R	75	F	39	32	37	118	40.7	39.75	.976	1.70	1.080
XIV	1	P	41	M	37	35	45	128	39.2	37.50	.956	1.74	1.062
XV	2	P	33	F	36	35	35	100	36.5	32.00	.876	1.71	1.056
XVI	2	P	40	M	36	35	43	123	39.35	33.00	.839	1.62	.934
XVII	1	R	105	M	35	28	30	110	38.1	34.50	.905	1.69	1.032
XVIII	1	R	120	F	32	29	33	123	37.2	34.50	.927	1.78	1.103
XIX	2	P	18	M	32	32	28	93	36.1	33.25	.921	1.82	1.083
XX	2	P	34	F	29	20	26	120	35.6	30.25	.844	1.69	1.018
XXI	2	R	82	M	29	29	34	118	36.1	33.25	.921	1.82	1.083
XXII	1	P	30	M	28	26	27	108	37.0	32.50	.878	1.69	1.018
XXIII	1	P	25	M	27	26	29	118	36.3	30.25	.833	1.64	.975
XXIV	2	R	82	F	27	24	25	110	35.1	29.00	.826	1.68	1.000
XXV													

individual characteristic behavior. At all other times the group will be considered as a whole and the effects of age, sex, or number of contacts will be analyzed for all the 25 subjects taken together.

B. TIME OF DAY

In the Clinic Nursery schedule there are two free-play periods during the morning. The first lasts from 8:45 to 10:00; the second, from about 10:45 till the time the children go home at 11:30. Two five minute[1] records were taken of the behavior of each child during the first 75 minutes; one in the last 45 minutes. This gave a sampling of 15 minutes of a child's behavior on each day of observation. The free-play periods were chosen in order to tap spontaneous expressive behavior and insure minimum adult supervision. Most of the observations were made between 9:00 and 9:45 o'clock, and 11:00 and 11:30. This narrowing of the time limits for observation was due to the fact that children were often late in arriving in the morning so that it was not until about 9:00 that the criterion of a social group[2] was met; the nursery routine curtailed the extent of the second period.

C. NUMBER OF INDOOR AND OUTDOOR RECORDS

On 113 of the 144 observation days, two records were taken indoors between 8:45 and 10:00 and one outdoors between 11:00 and 11:30. The 31 exceptions were as follows: On 15 days in the spring all three observations were made outdoors; on 12 stormy days the three observations had to be made indoors; on only one occasion were the two early morning records made outdoors and the last one indoors; and, finally, in three days, only the two early morning records were taken and the 11:00 to 11:30 observation missed.

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[1] A five-minute interval was used as the length of the observation period following the example of Arrington (6), Barker (8), Beaver (11), Olson (93, 94, 95), and Smith (112), all of whom studied different aspects of social behavior. Bott (19, p. 47) says in defense of establishing five minutes as the optimum length for a single observation: "A period of thirty minutes, or even of fifteen minutes, places a very considerable strain on the attentive powers of the observer and even the best trained observer is bound to have lapses in attention. Where the period is shortened to five minutes or less, it becomes much easier for the observer to maintain fixation on the task in hand. The pause between observations allows relief and recuperation from the strain of continuous observing."

[2] A social group was defined, following the criterion of Arrington (6), Beaver (11), and Loomis (86), as at least four children present.

D. RECORDING TECHNIQUE

1. *Preliminary Study.*

In the preliminary investigation, an attempt was made to observe all the aspects of expressive behavior of the child, but the list of items became so unwieldy that the investigation was finally limited to include the muscular movements involving only the face. Many patterns involving the hands, feet, and body had to be omitted because of this forced limitation and a great deal of general expressive behavior was lost.

In this study the terms "expression" and "expressive" will include not only the facial behavior reactions usually associated with the more pleasant and unpleasant affective states of individuals, such as laughing and crying, but also *all* facial movements, such as lifting eyebrows, pursing lips, thumbsucking, and singing. Because segregation of facial behavior into the traditional categories of "awe," "surprise," "shame," etc., has always introduced a large possibility of error in subjective interpretive judgment, it was at once decided that no such segregation would be attempted. At first an attempt was made to include in the list of behavior items, descriptive categories such as "aggression," "affection," and "general body activity," but even these were discarded because it was found that two simultaneous observers showed little correspondence when these descriptions were recorded at the same time as the facial expressive behavior. Since previous studies have shown that the repertoire of facial expressions in preschool children is fairly limited and simple, it was possible to formulate an observational study with rigidly defined, objective categories of facial behavior—categories which will not be too unwieldy and yet will comprehend and distinguish all the different muscular movements of the face which children of this age are capable of making.

2. *Recording Device.*

The recording device was contrived by Dr. R. W. Washburn in collaboration with Dr. Raymond Dodge (122), and has proved useful in other observational studies of social contacts of preschool children.[3] It "consists of a Becker time-marker so mounted that it can be adjusted over the left ear like the receiver of a telephone. The well defined ticking of the seconds by the time-marker can be clearly heard.

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[3] For further reference see the study by Washburn and Hilgard (125).

As each second is ticked off, a check mark is made by the observer on a sheet of paper which is held securely on a clip lapboard. A sliding ruler which moves freely across the surface of the lapboard so orients the hand that the check marks are made in a line across the page without the removal of the observer's eyes from the subject studied. The lapboard may be held across the left arm. The slide rule and pencil are easily managed by the right hand, whether the observer is seated or standing. A stop watch held in the left hand enables the observer to measure accurately the length of time during which the child is under observation" (125, p. 391).

The device was used in the following way. On the first second of the time interval to be recorded the observed expression was designated on a chart by an appropriate symbol. Each subsequent second of the duration of this expression was represented by a vertical line, which could be of three distinguishable lengths to differentiate the degrees of intensity of that expression. Changes in expression were recorded by changing the symbol. After each record was concluded, verbal descriptions of the preceding time period were written out in as detailed a manner as possible to help in reorienting the observer in the situation at some future date.

E. CATEGORIES OF BEHAVIOR AND SYMBOLS

The following is a list of the facial expressive behavior categories used in the present study and the symbols employed to differentiate each category.[4]

"A" . . . Attentive-expression
"V" . . . Vacant-expression
"T" . . . Talking (length of line denoting intensity)
"D" . . . Dramatic-vocal-expression
"S" . . . Singing (length of line denoting intensity)
"L" . . . Laughing (length of line denoting intensity)
"C" . . . Crying (length of line denoting intensity)
"F" . . . Facial-activity
"H" . . . Hand-to-face-activity
"=" . . . Indicates that the child is referring his behavior to other children
"<" . . Indicates that the child is referring his behavior to adults.

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[4] For a more complete discussion, definition, and differentiation of each category, see Appendix A pp. 633 to 636.

"T=+" Indicates that the child is replying to a conversation initiated by another child.

"T>+" Indicates that the child is replying to a conversation initiated by an adult.

"T=o" . Indicate conversations initiated by, (*a*) other children,
"T>" or (*b*) adults, to which the child under observation does not reply either immediately or at all.[5]

"/" . . . Is the symbol used in connection with "T" to simplify the recording of those times when the child being observed converses back and forth several times with some other child. It indicates that the other child is talking and is employed as a symbol only when the subject is listening with an attentive-expression and there is no muscular activity of the face.

"A" . . . This symbol is used every time the face of the child is so turned away that it cannot be seen, or that both eyes are not visible to the observer.

F. RECORDS OF OBSERVATIONS

As originally planned this study was to consist of 18 recordings for each of the 25 children; that is, three five-minute observations made on one day of each lunar month for six months. Thus each child was to be observed at intervals of four weeks; and on his day of observation, his behavior was to be recorded three times. This means that for the 25 children there should be 18 times 25 or 450 records. Actually sicknesses and colds intervened so that two children have only 12; one child has 14; four children have 15; and two children have 17 out of the 18 observations required for each child. Three children, observed 21 times were also included so that altogether there resulted a total of 429 records for the entire group of 25 subjects.

To express the results, each five-minute record was quantitatively analyzed by counting the number of seconds recorded for each type of expressive behavior within the total five-minute period. These sums were then expressed as percentages of the total number of seconds recorded. The percentages rather than the original scores were used because they were found to be less affected by timing and recording errors.[6] Furthermore, since the percentages are based on equivalent periods of time, they may be compared and treated statistically just as if they were the original scores. Mean percentages may be computed for the odd or even observations; or for a single day's series of three observations on each child. In all subsequent discussions, therefore, the percentage figures will be considered as "scores." The daily scores may be understood as the mean percentages for the three five-minute observations taken on a single day. By the individual "total scores" will be meant the mean individual percentages for the total period of observation, or 90 minutes. This seems justifiable because at any time one may compute approximately from these scores the original number of seconds duration of any activity within a stated interval of time.

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[5] See Appendix A (pp. 634-635), for limitations concerning the use of these behavior categories.

[6] See Appendix B.

The following two examples of five-minute records on two different children illustrate the recording technique, the representation of the results in terms of percentages, and the differences in the expressive characteristics of these two children,—differences which are clearly evident during these two brief five-minute samples. Child *V*'s face was attentive 63.3 per cent of the five-minute period; she smiled 2 per cent; mouthed with effort 0.3 per cent; and was turned away 4 per cent of the time. The rest of the time, or 29.4 per cent, she was engaged in talking. Child *XIX*'s face, in a similar length of time, was attentive 38.6 per cent of the time; he chewed on a crayon, or mouthed 53.8 per cent; was turned away 7.6 per cent of the time; and no talking was observed.

In the foregoing discussion of the percentages it should be noted that percentage scores for the "invisibility" symbol, "A", were computed along with the categories of expressive behavior observed. These were included because in the preliminary investigation large and small values for "A" were found to be characteristic of certain expressive types. This means that the expressive behavior percentage scores were based not on an actual five minutes of observation, but on varying intervals of time depending upon the number of seconds the "invisibility" symbol had been recorded in each five minutes.

Though the "A" scores averaged about the same for each child during the early observations, a difficulty arose which somewhat affected the percentage representation of the results. During the first 80 records, from November, 1934, to January, 1935, each observation record consisted of a consecutive five-minute period whether the

Smiling	6	seconds	percent of total	= 2.0
Talks to adults	49	"	" " "	= 16.3
Answers adults	14	"	" " "	= 4.7
Talks to children	22	"	" " "	= 7.3
Answers children	5	"	" " "	= 1.7
Talks to self	1	"	" " "	= 0.3
No expressive movement	190	"	" " "	= 63.3
Mouthing with effort	1	"	" " "	= 0.3
Face not observable	12	"	" " "	= 4.0
	300			99.9

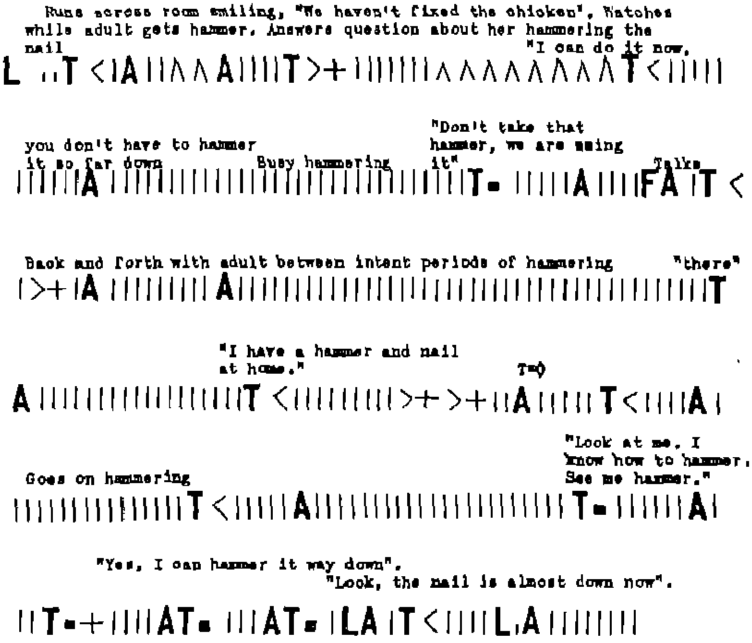

FIGURE 1
Subject V

face was visible to the observer or not.[7] In a few records so timed, however, very large percentage values for "A" resulted and the ex-

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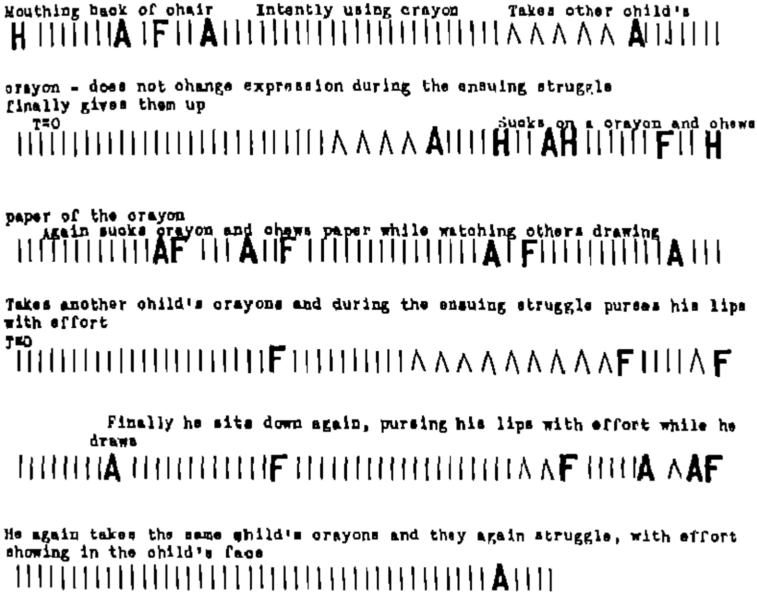
[7] The use of mirrors to obviate this difficulty proved to be impracticable in the particular social situation in which these children were observed. They might, however, prove useful in studying children whose activities have been limited in scope to a small defined area.

H	31 seconds	percent of total			=	10.2
F	132	"	"	"	=	43.6
A	117	"	"	"	=	38.6
Λ	23	"	"	"	=	7.6
	303					100.0



Mouthing back of chair   Intently using crayon   Takes other child's crayon - does not change expression during the ensuing struggle finally gives them up

T=0

Sucks on a crayon and chews paper of the crayon

Again sucks crayon and chews paper while watching others drawing

Takes another child's crayons and during the ensuing struggle purses his lips with effort

T=0

Finally he sits down again, pursing his lips with effort while he draws

He again takes the same child's crayons and they again struggle, with effort showing in the child's face

FIGURE 2
SUBJECT XIX

pressive behavior scores were thereby materially affected. In order to cut down these large "Λ" values the rest of the records were timed as a consecutive five-minute period in which the child's face and expression could be discerned. Momentary shifts away from the observer were recorded with the use of the appropriate symbol "Λ". After 10 seconds of consecutive use of this category, the stop watch was stopped and begun again when the child was more favorably turned. In going over the results of these final records, however, it was found that the differentiating quality of the scores for "Λ" had been lost in the revised technique. The question then arose whether the facial expressive behavior results should be expressed in terms of (*a*) actual scores, (*b*) percentages based on the actual time the child's face was observed, or (*c*) percentages based upon the number of seconds recorded.

The expression of the results in terms of the actual scores was discarded because these were found to be more affected by the timing and recording errors than were either the percentages based on (*b*) or (*c*). In order to determine the difference between these two methods of analysis the following comparison was made. The daily percentage scores for each child for "attentive" behavior based on the actual time the child's face was observed (checks for "Λ" not included), were compared with the scores for this same category based on the total number of seconds recorded (including checks for "Λ"). The individuals were then ranked for each of the six days according to these two scores (the value of "*A*" based on 300 minus the number of seconds recorded for "Λ"; and the value of "*A*" based on 300 seconds). The rank correlation coefficients[8] between these two methods of computing the percentage scores for the six days varied betwen .95 and .99. It is possible to conclude from this that each child will assume approximately the same rank in relation to his fellows no matter which method is used, and either treatment will show a differentiation. Therefore, since no outstanding differences could be found between the two methods of analysis, the percentages based on the five minutes of observation were used in expressing the results, because in this way the time interval at least remains practically constant for every observation for every subject.

In the future, the difficulties which arose in this exploratory study can easily be avoided if each observation interval is increased to at least seven minutes (including the number of seconds required for the "invisibility" symbol, "Λ", which was found in this study to be a recording necessity). Then it would be possible to count the first 300 seconds of *observed* facial expressive behavior, and the rest could be discarded. If this technique of recording were employed there would be no timing or recording errors to contend with and the actual scores could be used. Furthermore, if percentages were computed, they would be based upon comparable intervals, the total time of which is spent in actual observation.

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[8] In determining this correlation coefficient the Spearman foot rule formula $R = 1 - \frac{6 \Sigma G}{N^2-1}$ was used [See Garrett (50), pp. 193-195]. From this R the value of "r" may be inferred from an appropriate table, Garrett (50, p. 194).

III. RELIABILITY AND VALIDITY

A. RELIABILITY

According to Loomis, consistent results are a function of "the nature of the instrument, the skill of the observer, and the fluctuations in the behavior of the individual being observed" (86, p. 32). In the present study these three factors were checked[9] in several different ways and the results compared with those of previous, more controlled, statistical investigations.

The reliability of the device in the hands of the observer, or the nature of the instrument, was found to be high. In 89 per cent of the records the maximum possible percentage error in either timing or second-notations[10] was ±3 per cent or less, while in only 4 per cent of the records did it exceed ±13 per cent.

In determining the reliability of the observer in recording the data, or the skill of the observer, it was found that the "one-way-vision" screens did not effect the types of behavior recorded, and that two simultaneous observers showed amazingly high correspondence with respect to (*a*) second-notations, and (*b*) categories of behavior. Of the 4441 seconds of simultaneous observation, 96 per cent were checked alike; and of the 107 categories recorded, the two observers showed perfect agreement in 93 per cent.

The reliability or internal consistency of the data (fluctuations in the behavior of the individual) was checked by computing group odd-even rank correlation coefficients. Wherever comparisons were possible between these correlation coefficients and those of previous investigators, amazingly high correspondences were found in every instance. Moreover, in order to see how small a unit could be used to give predictable results, the scores for the last day's observations were ranked for the group, and coefficients of correlation were found between these and the ranks of the group according to their total scores. These correlations proved to be practically as high as the odd-even consistency correlations discussed above. The last observation was used because it seemed fairer to all the children to choose a time when each child had had practically the same length of time for initial adjustment. The last day's observation when the child has had six months to become well adjusted to the situation, then, may be considered to be fairly representative of the total, and appears to be as reliable a sample of that child's behavior as a much larger group of observations made over a period of time. In a later analysis, it will be shown how valid are the individual 90-minute samples (all observations included) and the individual daily 15-minute samples (three observations included).

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[9] Owing to the fact that so few subjects were observed in this study, too great emphasis may not be put upon the statistical computations involved in determining the reliability. All tables and their corresponding discussions, therefore, have not been inserted here, but may be found in Appendix B.

[10] I.e., symbols and lines recorded by the observer.

B. VALIDITY

Any measuring tool, whether it be a foot rule, an examination, or a short time-sample, is considered valid if it accurately determines that which it purports to measure. Very few previous investigators have shown the validity of their findings. Two who have been able to validate their results are (*a*) Brackett (22), who compared her individual records on laughing and crying with teacher ratings in these same activities and found correspondence; and (*b*) Olson (94) who, working with older children, found a preponderance of nervous habits in professedly neurotic groups as compared with normal children of the same age. In the present study, excerpts from the case histories, monthly nursery reports, and the personality ratings and rankings of two judges afforded further information and material on each subject which could be compared with the observational data for that same child. In this way some indication of the validity of the whole 90-minute sample, and of the shorter 15-minute samples could be checked. It was also possible to demonstrate that both the samples, (i.e., 90 minutes and 15 minutes) pictured the facial expressive behavior characteristics of each of the 25 subjects.

The extensive clinical records, including personality studies available for every member of this nursery school group, proved to be very helpful in determining the validity of the objective results. Excerpts dealing primarily with the items of behavior observed in this study were found in three places: (*a*) in the report at the developmental examination; (*b*) the mother's report and historical summary; and (*c*) the nursery teacher's summary and analysis of each child's personality and general social adjustment throughout the year. These excerpts made a list of impressions from different people all of whom were thoroughly familiar with the children under various conditions and with different points of view. A comparison between these descriptions of each child's characteristic behavior and the objective results of this study should indicate not only whether the sampling had been large enough to give a true picture of the child, but also whether the individual differences in patterns of expression were actually true differences, whether each child behaved in a characteristic manner in all situations, and which expressive items were most characteristic.

For nine subjects detailed reports of the nursery school teacher for the days when the observations of this study were made, were available. Thus the nursery descriptions of each child's behavior at the time of each contact during the six months could be compared with his 15-minute behavior sample for that day.

Also there were the ratings of the members of the group by two judges with respect to types and frequencies of nervous habits, and these could be compared with the types and scores for the nervous habits found not only in the case histories, but also in the present investigation.

The comparison between the case history excerpts and the results of the objective records was made on the chart showing the individual differences. On this chart is diagramatically represented the facial expressiveness of each of the 25 subjects. A differentiation is made betwen traits which were observed to occur either predominantly or rarely and those traits which occurred to a variable amount in more than half of the observations on each child. Similar classifications were then made for each individual for the same expressive items as they were found in the case histories. These two sets of classifications were then compared and those items which did not agree were indicated on the chart. If no mention could be found in the case history concerning any expressive behavior form, making impossible exact comparison in that time interval, or if the classifications did not agree for any one item, these facts were designated separately in the appropriate places on the chart.

Discrepancies were found in 33, or eight per cent of the 400 possible items, because comparable descriptive excerpts could not be found in the case histories. In only five instances, or one per cent of the 400, was there complete disagreement between the case history excerpts and the observed behavior. Insufficient sampling in the objective observations may have accounted for these five discrepancies because the behavior of these children was found to be quite variable over the six month period. Some of the variability in these children did not occur within the five-minute period of the test, but was evident within a longer period of time. If the variability occurs only in periods of time longer than the five-minute interval of observation, the oftener, of course, observations should be made. In future studies, to insure against this difficulty, more frequent observations should be gathered over the total period to get valid results on those children whose behavior is more than normally variable.

The total number of disagreements is only 38, or 9 per cent. In other words, 91 per cent of the observed items were found to agree with similar behavior reported in the case history by individuals who not only knew the children well but had worked with them over a long period of time. This high correspondence between the case history excerpts and the objective results of the present study demonstrates the validity of the method and the ability of a 90-minute sample taken at intervals over a period of six months to give a true picture of the expressive behavior characteristics of the subjects observed in this study.

In further validation of the 90-minute time-sample, comparisons were made between the types and frequency of the nervous habits which were observed during this study and those reported not only in the ratings by the two judges who worked with the children in the nursery, but also in the case history excerpts. The objective scores for all the subjects but one, in general-facial-activity ("*F*"), and hand-to-face-activity ("*H*"), corresponded with the descriptive estimates for these same activities in the case history excerpts and the judges' ratings. In five cases, however, the types of nervous habits observed did not agree. Incidences of thumbsucking, chewing-on-material, sucking-lips, and the like were observed in the short time sample, and were not mentioned either in the case history or by the two judges. Whether this can be considered a criticism of the validity of the time-sampling technique may be questioned. Very infrequent occurrences of a few mannerisms may not have been noticed by the judges or those reporting in the case history. This fact suggests that an objective observational technique such as this is not only adequate to differentiate individuals with respect to amounts and types of nervous habits, but may be even more complete and accurate.

As has already been mentioned, the nursery reports for nine subjects were descriptions which corresponded exactly to the days on which the observations of this study were taken. A brief summary

TABLE 2

SUBJECT XIV

Percentages of Duration of Time for Each Category of Behavior for Each Five-Minute Observation

Date (1934-35) and age in months	No. observation	Whisper	Talk	Shout	Smile	Chuckle	Laugh	Attentive	Facial	Hand and face	Frown	Whimper	Cry	Hum	Sing	Chant	Vacant	Dramatic	"X"	No. behavior shifts
11-28	1	2.3	4.0					62.5		1.0	1.0								29.3	12
37	2		3.7		0.7			77.0	18.0										0.7	10
	3		3.0	3.9				65.6	0.7					1.6				3.0	22.3	13
1- 9	1		6.6		1.0			48.2	6.0										38.1	14
38	2		10.9		17.0	8.5	4.4	47.7											11.6	30
	3		11.6		19.6	3.3	3.0	46.2	2.0									1.3	13.0	32
2- 4	1		1.3					41.8	45.8	1.3									9.8	12
39	2		2.4		1.4	0.3		62.6	24.1										9.2	13
	3	1.3	10.1		6.8	1.0	2.3	45.6	27.7										5.2	31
3-11	1		2.3		1.0			52.1	44.6										3.0	19
40	2		3.3		5.3			37.1	51.3											18
	3				0.7			39.7	55.3										4.3	7
4-15	1		21.2		5.5	2.8		23.4	19.6					1.4				10.3	13.8	51
42	2		5.1					38.1	53.3	3.4										25
	3		25.0	2.0	7.0			27.4	19.0	2.3				2.0				9.0	5.7	55
6- 4	1				1.4			58.7	13.1										26.9	11
43	2		4.4		6.2	1.0		64.6	14.1		0.7								8.9	29
	3		3.8		3.4		2.4	32.4	27.7	2.0								11.1	17.2	40

follows for several of these nine children indicating how all the comparisons were made.

Subject XIV (see Table 2 for his six daily scores) showed interesting trends during the period of observation. The following is a reduced but verbatim summary of the nursery report which describes the change in this child's behavior. There is a very close correspondence between this descriptive summary and the scores given in the accompanying table.

> His attendance was fairly regular for the first three months and he showed progressive increase in sociability.[11] There was an increase in laughter and ease outdoors as opposed to indoors. He was then out because of a bad cold for a month, and when he returned in March his behavior was similar to that found in November, with less social activity. By April he was again social and entered into the group activities. Soon after this, however, he was out again for almost two months, and his expressiveness early in June again approximated that seen in November.

Thus, the adjustment difficulties due to the unfortunate health conditions of this child were evident in both his scores and the nursery monthly report.

It might also be mentioned here that increased tension and irritability reported in the nursery records was also evident in the behavior scores of Subject XIII, who was observed to chew-on-material and whimper and cry progressively more often during the observations. Furthermore, both nursery records and this study showed that frequent anger outbursts and general increased variability were more and more characteristic of the behavior of Subject XVII during the six month's period. Both of these children were unusual in these respects and both had unusual physical adjustments to make. Subject XIII had to leave the nursery group for health reasons after only four months and was in bed for eighteen months with an obscure nervous disease. Subject XVII developed kidney complications within six months after his year in the nursery and has stayed in bed for over two years.

These findings suggest that by intensive observation certain types of behavior may be found which are related to problems of health adjustment. In these cases increased irritability, variability, and decreased sociability appeared like storm signals in the records of three children faced with atypical health difficulties.

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[11] Note talking, laughing, etc., in his Nov., Jan., and Feb. scores.

A descriptive summary of the behavior of Subject III is given as a fourth example of the correspondence between the daily objective scores and the nursery excerpts. Both types of analysis indicate that he persisted in essentially solitary activities during October and November. In December there was somewhat more social talking, though the more solitary expressive behavior forms were still present to a very high degree. By January he had again reverted slightly more to solitary types of behavior, was quite passive with a great deal of grimacing, and showed even less social cooperation than at the beginning of the year. On inquiry it was found that he had spent two weeks with his grandmother, who is reported to make him very tense annd withdrawn. He was again social and cooperative by February, and was even more so in March. Again, on inquiry, it was found that during the interval between his February and his March observations he had, when unable to come to the nursery, attended another school made up of children more nearly his age, and had made a very good adjustment there. More frequent contacts with other children may have accounted for the marked increase in social talking, smiling, singing, and chanting, and decrease in grimacing noted in his March observation and in the nursery report.

The comparisons for four of the remaining five subjects showed similar correspondence and have not, therefore, been included here.

The remaining child, Subject XII, was the only one of the nine children whose objective scores did not correspond with the descriptions of her behavior on three days when the observations were made. Incidences of crying were reported by the nursery teacher to occur frequently during October, December, and January, but no incidences were observed in the objective records. On inquiry it was found that the crying, negativism, and lack of cooperation occurred mostly during the routine activities and at the end of the morning when the child seemed over-tired. As these periods were not used in the observations, this lack of correspondence is probably due to a faulty sampling of the behavior of this child. Whereas the rest of the 24 children reacted at all times and in all situations in a characteristic manner, there was marked increase in irritability in Subject XII's expressive behavior in routine situations. In any study, therefore, of fundamental personality differentiations each child's behavior in different situations should be observed in order to get an adequate picture, because many individuals might be like Subject XII and react differently depending upon the situation.

C. SUMMARY

With a few minor exceptions only, the case history excerpts, the ratings by the two judges for all the 25 subjects, and the detailed nursery reports for the nine subjects correspond very closely with the facial expressive behavior scores for each child. This excellent agreement suggests that not only the 90-minute sample taken at intervals over a period of six months, but also a daily 15-minute sample taken at scattered intervals throughout the morning gives an accurate miniature of the total span of time covered by the observations. According to these comparisons, then, two conclusions may be drawn: (*a*) that "an individual may and commonly does behave in a given situation in a manner fundamentally characteristic of him" (123, p. 84); and (*b*) that the objective scores are valid representations, and the individual differences found between the subjects during the brief observations are the same as the differences noted by persons working with the children continuously.

It was intimated that in a few cases certain types of behavior indicated abnormal health conditions or adjustment difficulties. If, in later research, this suggestion proves to be true, then the short cut method of time-sampling may be not only valid but potentially useful in the clinical field.

IV. GENERAL DISCUSSION OF THE FACIAL EXPRESSIVE BEHAVIOR

In this section an attempt is made to acquaint the reader with the separate behavior items observed in this study. At the outset brief descriptive sketches will be given of the more unusual items. Following this, a comparison will be made between the present results and the findings of other investigators. Finally, certain relationships between other factors (such as location, attendance, and personality characteristics) and the data of this study will be indicated.

A. Brief Discussion of Certain of the More Unusual Behavior Items

The expressions that were displayed by every child were: talking, smiling, laughing, attentive-expression, and general facial activities ("*F*" and "*H*"). There were only two children, one four-year-old, Subject I, and one two-year-old, Subject XXI, who used every form of expression, and both of these children were boys. The patterning of the expressive behavior of the rest of the children was different for every child, making it difficult to group them into expressive types. These unique patterns of expressive behavior are discussed more fully in Section V.

Amounts of attentive-expression were found to be a function of the other amounts of expressive behavior; that is, very expressive individuals showed small "*A*" scores, and, conversely, inexpressive children had large values in this category. The older children tended to be more expressive than the younger children, and therefore, attentive-expression showed a decrease with age (see Table 4). But, whether this is a personality or a real age difference could not be determined within the limits of this investigation.

The behavior item called vacant-expression was included in the list of categories to be observed, since it describes a child's expression when he seems to be day-dreaming (attentive to no external stimuli). It was found to occur very seldom in the observed situation because the nursery experience is very stimulating for the average child, and it is only the exceptional, tired, withdrawn, or thoroughly negative individual who can completely abstract himself from the exciting environment. However, since vacant-expression is really a form of attention, being defined as attention to unobservable stimuli, the very infrequent time scores for it were added to those for "*A*", or attentive-expression, and the category vacant-expression was discarded. The final analyses were made on the basis of attentive-expression only.

The scores for the three intensity degrees of whispering, talking, and shouting, were expressed in two different ways. First the individual percentage scores were determined for each of these three items separately. Then the three (whispering, talking, and shouting) were combined for each child and segregated again on the basis of direction of conversation into three categories: talking-to-self, talking-to-adults, and talking-to-children, to show how much social conversation each child makes and with whom he usually talks.

It is difficult to find categories used in other studies comparable to dramatic-expression. Most of the previous investigators have included it with singing, humming, chanting, exclamations, and ejaculations within general categories such as, non-social, non-verbal, general-vocalization, random-vocalization, verbalization, and verbal tics. Dramatic-imitation as described by McCarthy (88) most closely approximates it. She found

> a small group of sounds that shows no definite tendency in relation to chronological age. It seems to be related more to personality factors of the individual children, to their habits of play, and to chance factors in the situation (88, p. 81).

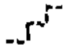
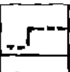
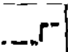
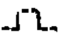
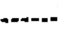
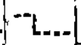
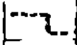
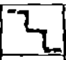
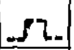
McCarthy found these sounds to be more characteristic of boys. In the present study also, boys were observed to use this form of behavior more than girls, but owing to the small number of children used in this investigation it was impossible to establish this sex difference statistically. Moreover, it occurred infrequently and seemed to be a type of behavior characteristic of some children and not of others. Also, although the findings of McCarthy, that there seemed to be no quantitative differentiation with regard to age, were confirmed, there appeared to be a qualitative aspect as shown by the fact that, while the younger children imitated trains, saying "choo," and autos saying "toot," the older children added bell, whistle, and steam noises to the train, and engine noises, sirens and further differentiating noises to their play with autos. These same qualitative differences have already been noted by Johnson (67), and are probably just another process of individuation in the general growth and development of expression.

Though it was thought at the beginning of the analysis of the data that combinations in the behavior categories such as total-vocalization, total-vocal-outlet, intense-vocal-outlet, etc. (see Table 5), might result in interesting correlations, no such findings were brought to light. The only significantly high correlations were the positive relationships between total-vocalization and the other forms of vocal expression. This is logical and to be expected since high values in total-vocalization are a function of high values in those items of which it is composed.

No published data could be found with which to compare the number-of-behavior-shifts. This method of analyzing the results proved to be excellent to demonstrate individual differences, because the mobility and facility of expression in each child could be indicated by the number of times his face shifted from one expression to another during a five-minute interval of observation. The number-of-behavior-shifts was easily ascertained by counting the number of symbol changes in each record. The results of this method of analysis indicate that there were more shifts among the older children. A high positive rank correlation between age and the number-of-behavior-shifts further confirms this fact (see Table 5). During this analysis it was noticed also that the number-of-behavior-shifts increased in the last morning observation. Table 3 indicates diagramatically the frequency and the patterns in the number-of-behavior-shifts in each of three observations in a daily series. The nine columns may be explained as follows. If the line in the patterns progressively steps upward, as in the first column, this means that the number-of-shifts has progressively increased throughout the three morning observations; that is, there is an increase of 10 or more shifts during the second observation over the number recorded during the first observation, and

TABLE 3

SHOWING DIAGRAMATICALLY THE NUMBER-OF-SHIFTS AT EACH OBSERVATION AS COMPARED WITH THE NUMBER-OF-SHIFTS OF THE OTHER TWO OBSERVATIONS ON THE SAME DAY*

Patterns of Shifts									
Frequency of Occurrence	16	13	28	17	37	11	5	3	4

* The line goes up or down with a step ┌ or ┐ when the difference between any two daily observations is greater or less than ten. It remains level if the difference is within 10.

10 or more during the third over the total for the second observation. If two or more contiguous observations have the same number-of-shifts within ±10, the line extends horizontally. If the number-of-shifts is less, at a later observation, by 10 or more, then the line steps downward. A scattering of all the different patterns was found, but there were fewer cases in the patterns where the number-of-shifts decreased during the morning. The total sum of the frequencies in the last four columns is equal to only 17 per cent of the total number of cases. The greatest frequency is 37 or 28 per cent in the fifth category, indicating that on a large number of days little change in shifts occurred between the different morning observations; 73, or 55 per cent of the records, show an increase in the number of shifts at some time during the morning. Most of these are scattered in the third column which shows that the first two observations indoors had about the same number-of-behavior-shifts and that there was an increase in those records in the outdoor period. That this same increase occurred also in the third observation period when the children had to remain indoors, suggests that the time of day is more a factor in this increase than is location. This stimulating effect of the nursery school environment has been found by Felder (46), who concludes that both location and time of day affect the number of anger outbreaks. The number-of-shifts should not be taken as indicative of mood swings. It merely demonstrates the greater motility of facial expression in children at the end of the morning, and is especially apparent in the more vascillating expressive types.[12]

B. GROUP RESULTS IN THE PRESENT STUDY WHICH WERE COMPARABLE AND SHOWED AGREEMENT WITH PREVIOUS FINDINGS

1. *Methods of Making Comparisons.*

Table 4 gives the individual total scores for the 25 subjects of this study, and the medians and quartiles for each facial expression. The median chronological age for the group is 39 months. Wherever possible the medians for each item of behavior were compared with previous data on three year old children, as well as with preschool groups as a whole. Besides these direct comparisons, scatter diagrams were made for each item of behavior, tabulating the 25 individual total scores by two-month intervals (each child's score tabulated in

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[12] For further discussion as to the value of such an analysis see Section V.

TABLE 4

INDICATING THE TOTAL SCORES FOR EACH CATEGORY OF FACIAL EXPRESSIVE BEHAVIOR FOR EACH OF THE TWENTY-FIVE CHILDREN DURING THE SIX MONTHS' PERIOD OF OBSERVATION

(The 1934-1935 and the 1935-1936 Groups Combined, and Children Numbered According to Chronological Age)

Children numbered according to chronological age	Whisper	Talk	Shout	Talk to self	Talk to children	Talk to adults	Smile	Chuckle	Laugh	Chuckle - laugh	Attentive	Facial	Hand and Face	Frown	Whimper	Frown-whimper-cry	Cry	Hum	Sing	Chant	Sing - chant	Dramatic	No.Behavior Shifts
I	.5	23.0	3.7	2.1	13.7	9.4	3.6	.4	2.2	2.6	41.3	8.4	.7	.1	.1	.4	.2	3.1	1.4	1.0	2.4	4.0	36
II	.4	18.3	1.2	1.6	15.0	3.1	9.9	.9	1.7	2.6	51.0	2.2	.2	.2		.2		.2	.2	1.6	1.8	2.3	33
III	1.0	14.4	1.2	7.9	5.5	3.1	1.1		.1	.1	38.9	20.3	1.1	.2		.2		1.2	1.1	4.8	5.9	5.4	36
IV		12.2	1.7	.7	9.5	3.7	1.8	.8	.2	.9	50.8	13.4	2.8	.3	.1	.4				.3	.3		25
V	.3	32.0	1.8	.6	22.5	10.6	3.7	1.5	1.0	2.3	46.5	4.5	.7	.5	.4	1.3	.2					.1	35
VI	.3	29.5	4.0	7.7	18.7	7.4	4.4	.2	.4	.6	19.9	14.0	.6					1.0	1.9	2.4	4.3	2.2	33
VII	.1	18.1	3.0	3.0	14.3	3.9	8.3	1.7	2.2	3.9	40.7	7.2	2.4					.2	.1	1.3	1.4	3.3	43
VIII	.1	13.7	1.2	6.1	3.8	4.6	2.7	.2	.1	.3	44.0	16.0	.3	.2		.2		1.1	1.5	.9	2.4	4.2	35
IX		14.9	2.1	.8	9.7	6.4	6.7	1.7	.6	2.3	43.1	5.7	3.8	.2	.2	.4			.1		.1	8.4	33
X	.4	16.5	.2	1.7	11.9	3.5	3.2	.9	2.6	3.3	53.1	7.9	.7	1.0		1.0		.1	.8	.4	1.2	.3	25
XI	.1	11.9	.3	1.2	3.9	7.2	7.6	2.7	3.1	5.8	45.1	17.0	.6	.4		.4		.1	.1	1.0	1.1	.2	32
XII	.3	15.9	2.0	1.3	7.5	9.5	11.0	1.3	1.4	2.7	31.1	17.8	3.6	.1		.1		.4	.3	1.5	1.8	.6	49
XIII	.4	23.0	.9	1.3	11.8	11.1	1.6	.3	.6	.9	37.1	6.8	8.4	.2	1.3	1.8	.3		.1		.1		31
XIV	.2	6.6	.4	1.1	3.0	3.0	4.3	.9	.7	1.6	48.3	23.4	.6	.1		.1		.3				3.0	24
XV		12.2	1.1	.3	6.9	6.2	4.1	1.3	.7	2.0	53.1	6.3	6.5	.3	2.1	5.1	2.7	.1					33
XVI	.1	16.0	.3	1.9	7.3	7.3	3.5	.2	.1	.3	48.0	10.1	4.2	.2		.2		.5	.2	.7	.9	2.4	40
XVII	.1	18.7	1.3	4.1	7.2	6.8	5.9	.7	1.5	2.2	42.7	5.8	2.2	.1	.1	.2		.2	1.3	.3	1.6	2.9	31
XVIII		15.6	.2	.1	14.1	2.6	5.6	.2	1.3	1.7	47.2	13.7	2.4	.1	.4	1.5	1.0					.1	32
XIX		2.0		.6	.4	.9	5.3	.7	.1	.8	55.9	8.8	5.0	2.1	4.3	7.6	1.2			.1	.1	.5	24
XX		10.7	.5	3.9	3.2	3.5	5.1	1.2	1.3	2.5	55.7	10.0	1.4	.1		.1			.4	.2	.6	.2	31
XXI	.4	10.9	1.4	2.6	4.9	5.3	2.3	1.1	2.8	3.9	34.2	3.0	4.7	1.2	.9	2.8	.7	.1	.4	1.3	1.7	1.1	33
XXII	.1	15.7	2.6	5.9	7.6	5.2	4.4	.3	1.2	1.5	49.4	3.9	.4	.2		.2		.6	.4	3.6	4.0	6.1	32
XXIII	.4	13.3	1.5	6.5	5.7	3.1	3.0		.3	.3	58.2	3.7	2.2	.4	2.4	4.0	1.2	.3	.2	.3	.5	1.5	25
XXIV	.2	13.3	.2	4.3	5.5	3.6	5.2	.1	.5	.6	53.6	10.1	.6		.2	.2		.2		.2	.2	.7	34
XXV	.2	8.0	.4	1.6	5.6	.5	4.8	.6	1.3	2.1	55.6	4.8	3.1	2.1	2.6	11.5	5.8		.6	1.2	1.7	.1	23
Q1	0	11.9	.3	.8	4.9	3.1	3.0	.2	.3	.6	41.3	4.8	.6	.1	0	.2	0	0	0	0	.1	.1	25
MEDIAN	.2	14.9	1.2	1.8	7.5	4.8	4.4	.7	1.0	2.0	48.0	8.4	2.2	.2	.1	.4	0	.2	.2	.4	1.1	1.1	33
Q3	.4	18.3	2.0	4.3	14.1	7.4	5.9	1.3	1.7	2.6	53.8	14.0	4.2	.4	.9	1.8	.7	.5	.8	1.3	1.8	4.0	36

TABLE 5

INDICATING SOME OF THE INTERCORRELATIONS BETWEEN PHYSICAL AND MENTAL TRAITS, AND THE FACIAL EXPRESSIVE BEHAVIOR ITEMS

	Whisper	Talk	Shout	Duration talks alone	Duration talks adults	Duration talks children	Duration talks persons	Frequency talks adults	Frequency talks children	Frequency talks persons	Smile	Hum	Sing	Chant
C.A.	.31	.47	.41	—.18	.28	.50	.54	.09	.38	.41	—.11	.28	.11	.26
D.R.	.18	.34	.21	.07	.28	.18	.26	.26	.29	.29	—.18	.32	.16	—.02
W/H				—.62			.59			.45	.04			
W/H²				—.57						—.09	.18			
W/NW				—.61			.32			.24	.21			
T persons											.14			
Smile							.14							
Chuckle-Laugh					.12	.24	.37				.50			
Whimper-Cry							.02							
Frown							—.29							
Frown-Whimper-Cry														
"F"-"H"				—.26										
Attendance							.38			.49	.54	—.23	—.26	—.21
Shifts							.58							
Hum-Sing-Chant				.80										
Dramatic				.67										

TABLE 5 (*continued*)

	Frown	Dramatic	Total vocalization[1]	Whimper-Cry	Chuckle-Laugh	Smile-Chuckle-Laugh	Vocal outlet[2]	Intense vocal outlet[3]	"+" Qualities[4]	"—" Qualities[5]	Attentive	Facial	Hand and face	No. behavior shifts
C.A.	—.02	.24	.57	—.57	.21		.26	.49	.37	—.11	—.58	.29	—.41	.50
D.R.	—.14	.29	.41	—.19	.09		—.07	.28	.12	.07	—.49	.28	—.14	.55
W/H	.05		.24	—.04	.40		—.04	.04	.18	—.11				
W/H[7]	.32		—.40	.51	.34		.04	—.26	—.07	.41				
W/NW	.12		—.09	.51	.41		—.04	—.02	.09	.11				
T persons	—.29		.78	.02	.37		.12							.58
Smile					.50									
Chuckle-Laugh				—.02										
Whimper-Cry	.51				—.02									
Frown				.51										
Frown-Whimper-Cry						—.09								
"F"-"H"		—.04	—.22	—.26	—.34		—.38	—.29						
Attendance	—.19	—.21		—.04	.55		—.31				—.18			.07
Shifts			.65											
Hum-Sing-Chant		.70	.54			—.02								
Dramatic			.68											

1. Total vocalization: converses with self (includes whisper and shout), converses with persons (includes whisper and shout), whimpering, dramatic, singing, chanting.
2. Total vocal outlet: shout, chuckle, chant, laugh, whimper, cry, sing, *"D."*
3. Total intense vocal outlet: shout, chant, sing, laugh, *"D."*
4. Total "+" qualities: smile, chuckle, hum, sing, chant, *"D."*
5. Total "—" qualities: frown, cry, *whimper*, *"F,"* "H."
6. *Note* for 25 cases the following correlation coefficients have the following Probable Errors:

.20±.13	.60±.08
.30±.12	.70±.07
.40±.11	.80±.05
.50±.10	.90±.03

7. These are rank *"R"* converted into Pearson *"r."*

the interval nearest his age at the midpoint of the period of observation), and designating the boys and girls separately. The age trends noticed in such an analysis were then checked by rank correlation coefficients (see Table 5). The apparent sex differences could not be checked mathematically. Rank correlation coefficients (see Table 5) were also computed to indicate relationships (*a*) between various factors (such as attendance, location, etc.) and the separate facial expressions; and (*b*) between the behavior items themselves.

2. *Results and Relationships.*

a. The comparisons between the medians of the present group and averages determined previously, not only on groups of three year old children but also on preschool groups (all ages combined), indicated perfect agreement in laughing, crying, and talking. The present medians in whispering, shouting, and singing agreed with other findings on preschool groups where no differentiations had been made in terms of age.

b. The scatter diagrams showed the same increase with maturity which others have found in the categories talking-to-children, talking-to-persons, and total-vocalization; and the same decrease with age in whimper-cry and hand-to-face-activity ("*H*"). These trends were confirmed by significantly high positive rank correlation coefficients between age and the categories of behavior which were found to increase with maturity, and significantly high negative relationships between age and the items which decreased (see Table 5).

c. In the above mentioned scatter diagrams the boys and girls were designated separately. It was not found that the girls used any form of expressive behavior more than boys, but larger percent scores were recorded among the boys in talking-to-self, hum-sing-chant combined, dramatic-vocalization, and total-vocalization. This tendency for boys to employ more of the non-comprehensible, non-conversational vocalizations than girls has been noted in previous studies of talking.[13] Furthermore, a scatter diagram for talking-to-children brought up no marked sex differences, a fact also noted in previous studies. It seems, therefore, that, though boys tend to indulge in solitary vocalizations more than girls, they tend to have equal amounts of social vocalization.

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[13] See McCarthy (88), Fisher (47, 48), and Nelson (91). For further discussion as to the personality differences with respect to talking-to-self, see Bott (20, pp. 105-107).

d. Several other interrelations were found which agreed with similar trends noted by previous investigators. Positive rank correlation coefficients were found between:

1). Smiling and chuckle-laugh
2). Smiling, chuckle, laugh and attendance
3). *Frowning* and whimper-cry
4). Talking-to-persons and chuckle-laugh
5). Chuckle-laugh and the three indices of body-build:
    weight/height
    weight/height^2
    weight/normal weight
6). Talking-to-persons and weight/height
7). Whimper-cry and weight/height^2

Negative rank correlation coefficients were found between:

8). Talking-to-self and the three indices of body-build:
    weight/height
    weight/height^2
    weight/normal weight

The relationships found in 5), 6), 7), and 8) above confirm the findings of other investigators that the stockier, fatter, pycnic body types tend to be more sociable, extraverted, and expressive.

C. GROUP RESULTS IN THE PRESENT STUDY WHICH WERE COMPARABLE WITH PREVIOUS FINDINGS AND DID NOT SHOW COMPLETE AGREEMENT

Small but consistently negative rank correlation coefficients were found between the combination of "*F*" (facial-activity) and "*H*" (hand-to-face-activity) and the five combinations of the vocal expressive items, i.e., whimper-cry, chuckle-laugh, vocal-outlet, intense-vocal-outlet, and total-vocalization. These findings indicate that there may possibly be a tendency for those children who are more vocally expressive to resort less to the silent facial movements.[14]

D. NEW INTERRELATIONSHIPS FOUND IN THE PRESENT STUDY

1. High positive relationships were found between the various forms of non-social vocalization. This finding indicates that in this

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[14] For further discussion of the controversy on this point, see Koch (73, p. 162).

study those individuals who were in the habit of talking to themselves could also be counted on to hum-sing-chant or dramatize vocally and vice versa.

2. Developmental ratio was related positively to the number-of-behavior-shifts and negatively with amounts of attentive-expression. These coefficients indicate that there is some relationship between intelligence and the facial motility of this group of children. The present conditions and definitions were not analogous to other studies on facial motility,[15] but the results suggest conclusions similar to those of these other investigators.

3. The number-of-behavior-shifts correlated highly and positively with talking-to-persons. This is logical since there will be many shifts in the symbols as a child talks, listens, and talks again with another individual. Furthermore, this relationship suggests that, since age has also proven to be a factor in the amount of social conversation, this and the number-of-behavior-shifts are inter-dependent and are both a function of the age variable.

E. Relationships between the Types of Material and Certain of the Expressive Behavior Items

At the end of each five-minute observation, the social conditions, play situations, and material used by the subjects during the period were briefly described as accurately as possible on the record. Tabulations were then made indicating the type of material in use when each type of expressive behavior was observed. Interesting relationships could be found in only five types of expression: whispering, shouting, humming, sing-chant, and dramatic-vocalization. Table 6 indicates the six types of material most frequently used in connection with each of these five expressions, the number of occasions this relationship occurred, and the number of children (boys and girls designated separately) responsible for its occurrence. Whispering, or quiet talking (usually to self) was exclusively evident in the more gentle occupations such as drawing, cutting, modelling, looking at books, and using sand or snow; whereas shouting was found predominantly in connection with the more active occupations, especially play with boats and the pool and rough play. Boys were more

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[15] See studies of Kwint (78), Mischenko (89), Dukhovnaya (140), Mourschawsky (146), and others.

TABLE 6

GIVING THE FREQUENCIES WITH WHICH EACH TYPE OF MATERIAL IS ASSOCIATED WITH THE FIVE ITEMS OF BEHAVIOR: WHISPERING, SHOUTING, HUMMING, SING-CHANT, AND DRAMATIC-VOCALIZATION; AND THE NUMBER OF BOYS AND GIRLS RESPONSIBLE FOR THESE FREQUENCIES

Material	*Whispering*			*Shouting*			*Humming*			*Sing-chant*			Dramatic-vocalization		
*	F	B	G	F	B	G	F	B	G	F	B	G	F	B	G
No material	14	6	2	120	10	9									
Doll, dog, bear	7	4	2				8	3	1	7	3	1	3	2	1
Clay, drawing, cutting	7	5	1												
Kiddie Kar tricycle	6	4	1	13	9		9	6	1	20	10	1	27	8	2
Book	5	2													
Beads, small toys	4	3					4	2							
Snow, sand	4	2	1												
Watching	3	2	1				9	4	1						
Blocks	3	1	1	7	4	1	4	3	1	8	2	2	3	2	1
Pool, boats				10	3	3									
Car, truck				10	4	1	4	3		13	9	1	63	13	1
Train				9	3	1	4	3	1	5	3		32	9	1
Wheelbarrow, baby-carriage													5	2	
Horse on wheels													8	4	1
Body rocking							5	3		29	7	2			
Running				16	6	3				7	3	1	4	3	1
Slide, Jungle Gym				18	7	5	8	4	2	22	5	5			
Rough play				10	4										
Word play							18	7	1	52	13	4			

*F—Frequency.
B—Number of boys.
G—Number of girls.

responsible than girls for all these relationships except in play with boats and the pool. The Kiddie Kar and the tricycle brought out all five types of behavior in the boys and all but shouting in the girls, but in every case the type of behavior associated with the play material was more characteristic of boys. Humming, sing-chant, and dramatic-vocalization occurred generally in connection with the movable toys, especially those involving gross motor activity, and seemed to be more characteristic of boys than girls. All five types of behavior were observed during block play, and boys and girls were about equally responsible for these relationships. These findings suggest that incidences of these five expressions are dependent to a certain extent upon the material in use. However, one cannot state that this is a causal relationship. Complete dependence of expression on material is complicated by several facts evident in the above discussion: (*a*) Marked sex differences were found not only in the amounts and types of expression but also in the choice of toys; (*b*) Although all five forms of expression were observed in both boys and girls in connection with the use of certain materials (such as the Kiddie Kar and the tricycle), the fact that the expressive items under discussion were found more frequently among the boys than among the girls, may imply that the boys chose and used such material more than the girls; and (c) Other materials, like the blocks, showed no differentiation either with the five facial expressions or with sex. These three facts suggest that the problem is further complicated by underlying personality factors affecting both the choice of materials and the facial expressions. Since the causality of this relationship cannot be determined, further discussion will be reserved for the study of personality differences taken up in Section V.

F. THE INDOOR-OUTDOOR VARIABLE AND ITS RELATION TO THE ITEMS OF FACIAL EXPRESSIONS

Most of the investigators in the field of social behavior who have attempted to isolate the function of location upon the activity patterns of children are generally agreed that situation has a profound affect upon the results. If this factor is not taken into consideration and allowances are not made for it, there arises a distinct error in the interpretation and validation of the results. In order to check the effects of situation on the expressive reactions of each subject in the present investigation, the records for the group were analyzed in such a way that with time-of-day held constant, the indoor-outdoor variable could be determined. Though larger values in all forms of expressive behavior were found in the outdoor situation, the differences were variable and proved to be statistically unreliable. Furthermore, the differences found may be a function of the types of play materials rather than location. More possiblities were afforded outdoors, for the children to use the movable toys which already have been shown to be connected with the more expressive types of behavior. Until the variables of time-of-day, location, and materials can be fully controlled, no conclusions can be drawn as to the effect of location upon the types of facial expressive behavior.

G. ATTENDANCE AND ITS RELATION TO THE ITEMS OF FACIAL EXPRESSION

Similar to the findings of Goodenough (56) amounts of smiling, chuckle-laugh, and talking-to-persons, were found to be affected by attendance. This fact came out of two distinct analyses of the present results. Rank correlation coefficients between the number of contacts each child made with the nursery during the year and his total scores for the different types of facial expression observed in the present study, indicated that there was increased smiling, chuckling, laughing, and social talking among those who attended the nursery more often. To check possible changes in the group over the six month period a study was made of the records of 18 children[16] who were observed one day each month for the six months. The scores of the records for the first were combined with those of the second months, those of the third with the fourth, and those of the fifth with the sixth, thus dividing the total period into thirds. Group averages were computed and compared for each expressive behavior item for the three two month periods. In talking (middle intensity degree), talking-to-persons, smiling, chuckling, and laughing, these averages showed a progressive increase from the first two months to the fifth and sixth months. This finding confirms the above mentioned correlation coefficients, and points to the conclusion that during the six months that this group of children were attending nursery school, certain changes were taking place in those habits of expression usually considered more social. The variables, however, of age, sex, and situation could not be controlled adequately in a group as small as this, so, even though two independent analyses of the data point to a positive relationship between attendance and the more social expressive behavior forms, no clear cut conclusions could be drawn.

II. RELATIONSHIPS BETWEEN JUDGED PERSONALITY CHARACTERISTICS OF THE TWENTY-FIVE CHILDREN AND CERTAIN OF THE EXPRESSIVE BEHAVIOR ITEMS

Two individuals, who worked with the children in the nursery, rated them in terms of general personality traits such as activity drive, nervous habits and tenseness. They also noted each child's relationships with adults and with children. The children were then ranked by these two individuals according to (*a*) general social adjustment, and (*b*) predictability in behavior. These ratings and rankings were then compared with the results of the present investigation to elicit any trends or relationships.

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[16] Eighteen children only were observed at least six times.

1. The relationships between the individual per cent scores for talking-to-children and the rated adjustment-to-children was quite close. There were only six children (Subjects II, IV, X, XVI, XII and XXIV), those per cent scores for talking-to-children did not agree with the ratings. Of these, the first four talked-to-children more than the median for the group, and yet were given low sociability and adjustment ratings in their judged relationships with children. Further analysis showed that all these children were those with problem tendencies whose behavior was characteristically variable. The variability of these may account for their low sociability ratings. Subject II whose scores for talking-to-children was slightly more than the group median was next to the oldest subject, so his was a much lower total score than would be expected at his age. This age factor may also account for the high rating for Subject XXIV whose scores for talking-to-children, though high for her age, still does not exceed the group median. The other exception was Subject XII whose nursery report and objective records showed little correspondence, as has been indicated.

2. As compared with the above child-child relationships, there were only three cases showing lack of correspondence between the amounts recorded for their *talking-with-adults* and the ratings for adjustment-to-adults. Subject XVII had a high total score but was rated low; Subjects XVIII and XXIV had low total scores but were rated high. As above, in discussing talking-with-children, the variability factor may have accounted for the low rating of Subject XVII, and the age factor the high rating of the two two-year-olds, Subjects XVIII and XXIV.

3. A comparison was then made between the rankings of the members of the group with respect to social adjustment and the ranking of the group according to the total per cent scores for social talking. But in such an analysis the difficulty in the treatment of ranks became apparent. The judges found no difficulty in dividing the well-adjusted from the poorly adjusted, but they found it practically impossible to rank successfully those in between. It seemed, therefore, only fair to divide the group into thirds, placing

the eight highest and the eight lowest in two groups and the nine ranging about the average in a third group (see Table 7). This was done for the group by each judge separately. In determining the ranking of the percentage scores for the 25 children, all the subjects who had high scores for solitary talking and low scores for all types of social talking were put in the lowest group. Those who had low total scores for talking-to-self and high scores for talking-to-persons were put in the highest group. The remainder were placed in the middle group.

TABLE 7

GROUPING OF THE SUBJECTS WITH RESPECT TO SOCIAL ADJUSTMENT, ACCORDING TO THE RANKINGS OF THE TWO JUDGES AND THE AMOUNT OF OBJECTIVELY DETERMINED SOCIAL TALKING

	Judge *A*	Judge *B*	Objectively determined results
Most	XVIII	XXIV	I
	VIII	XVIII	V
	I	I	XIII
socially	XXV	VIII	XVIII
	XXIV	XII	II
	XVI	XVI	XXIV
adjusted	XIV	XIII	IX
	XIII	XIV	XII
	XXIII	VII	XXV
	XXI	XXV	XVI
	XXII	XXII	VII
	XIX	V	X
Average	VII	XXIII	VI
	XII	XXI	XI
	V	XIX	XXI
	VI	XVII	XVII
	II	II	XXIII
Least	XVII	IV	XX
	XI	XV	XXII
	X	III	III
socially	IV	XX	VIII
	XX	XI	IV
	III	VI	XV
adjusted	IX	IX	XIV
	XV	X	XIX

Judge *A* and Judge *B* placed 21 in the same groups.
Judge *A* and this study placed 12 in the same groups.
Judge *B* and this study placed 14 in the same groups.
Judges (*A* or *B*) and this study placed 15 in the same groups.
Judges (*A* and *B*) and this study placed 11 in the same groups.

Another method of analysis was used where each child was considered to be in the same group as another if he were within five places up or down in the ranking lists. Thus Subject XVII is No. 18 in Judge *A*'s list and No. 16 in Judge *B*'s list—only two places apart in the rankings and, therefore, probably of similar rank, though in different groups according to the first method of analysis. According to this second "within five" method of grouping, the following correspondences were found:

Judge *A* and Judge *B* placed 22 in the same groups.
Judge *A* and this study placed 16 in the same groups.
Judge *B* and this study placed 15 in the same groups.
Judge (*A* or *B*) and this study placed 17 in the same groups.
Judge (*A* and *B*) and this study placed 12 in the same groups.

The correspondence between the amount of social talking and the rankings of the judges is fairly high, but seems to show that the scoring of social talking is not quite as adequate a method of ascertaining the degree of social adjustment as the ranking of a person acquainted with the children, for the two judges showed practically perfect agreement when compared with each other. This lack of complete agreement between the rankings of the study and the judges may be due to the fact that three of the children (Subjects II, IV, and V), who ranked fairly high in the amounts of social talking, were not accepted by the other members of the group because of faulty social techniques, and so ranked low with the judges; and three children (Subjects VIII, XIV, and XIX), whose scores for social talking were below the median for the group, entered into the group activities and were sought after by the other members of the group even though they offered less conversational stimulation. The conclusion may be drawn from these comparisons that, though the amount of social talking is a fairly high indication of social adjustment, it is not as reliable as rankings by persons dealing with the children, and is incapable of differentiating those children whose social adjustments are based upon other factors than the mere interchange of ideas.

4. As has already been pointed out, each judge ranked every member of the group according to predictability of behavior.[17] To avoid

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[17] By predictability is meant not only consistency in behavior, but also behavior which is consistently variable. Therefore, children who may be counted upon to react in an inconsistent manner were considered in a sense just as predictable as those whose general personality characteristics usually remained the same.

errors in ranking for those who were grouped around an average, the same technique of grouping was employed in this analysis as had been used in the rankings for social adjustment. The results of the observations of the present study were then analyzed in many ways to see if any means could be devised for presenting the material to indicate close relationships between known predictability and scores for the facial expressive behavior items. It was, however, impossible to find a single method of analysis which corresponded as accurately with either of the two judges as they did with each other.

5. There were seven children who were rated by the two judges as hyperactive or very active. Of these, six were boys, and five had high total scores for the number-of-behavior-shifts and low scores for hand-to-face-activity, or "*H*". On the other hand, there were eight individuals in the group who were rated as being somewhat passive or lethargic. Seven of these had low, and only one had high scores in the number-of-behavior-shifts. These findings indicate that there may be a positive relationship between general body activity and facial motility, and a negative relationship between general body activity and thumb-sucking, chewing-on-material, and other nervous habits associated with hand-to-face-activity.

6. No relationships could be found for those individuals characterized as being either tense or relaxed. With this group of children, tenseness or relaxation was expressed in different ways and there were no consistnt characteristic facial expressions.

I. SUMMARY

In this section the more unusual facial expressive behavior forms used in this study were briefly discussed, and certain relationships between them and other factors were described. The many points of correspondence were listed between the present results and those of previous investigators with respect to age, sex, and other interrelationships. In all but one case there was perfect agreement. Finally, interesting relationships were suggested between various items of behavior and certain types of material, location, attendance, and several of the personality attributes of these children according to the ratings of two judges.

V. DISCUSSION OF INDIVIDUAL DIFFERENCES IN THE FACIAL EXPRESSIVE BEHAVIOR ITEMS

According to Arrington (6), and Barker (8), in order that definite individual differences as well as group trends in behavior may be detected, each individual should demonstrate a certain degree of consistency of behavior from observation to observation.[18] In the first place, if a child's behavior is inconsistent, this causes errors in sampling and cuts down the reliability. In the second place, the behavior pattern of a child may be differentiated from those of his fellows only if a constant relationship is maintained between the separate items of his pattern and those of the group pattern. This does not mean that the formal patterns of the behavior of individuals to be compared may not change with growth or development, but it does mean that certain fundamental, and basic traits, though responding to normal development, are maintained to a consistent and characteristic degree in each individual.

There are three steps, therefore, to be taken before individual differences can be established: (*a*) developmental trends for the group should be defined as far as possible; (*b*) there should be some expression of the relation between the scores for each individual and the figures found for the developmental trends; and (*c*) the consistency or the maintenance of these relationships over a period of time should be established.

Most of the previous investigations have been interested primarily in developing group trends and in studying the group consistency over the period of observation. Nearly all of these authors have tested the consistency of their data by the use of odd-even and first-half, second-half correlation coefficients, and these are accepted methods of arriving at such determinations. A few observers have, however, tried to go a bit further than this in their consistency analyses, and express the relation between the scores for each individual and the figures found for the developmental trends.

A method that investigators have used is retesting *the group* for the same point of view after a period of time, varying in the different studies from several weeks to a year. Most of them, notably Barker (8), Loomis (86), Arrington (6), Jersild (65), Bonham and Sargent (16), and Brackett (22), have noted the group change over the period in terms either of separate means, or rank correlations, or expressed as the sum of the individual variations about the group means. In these studies of time comparison, out of all the social and personality traits observed, talking and laughing (but not smiling) were the only ones which showed a degree of consistency for the group over a period of time.

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[18] For further reference see (6, p. 61).

A few authors, Shirley (108), Bott (20), Bayley (9), Washburn and Hilgard (125), and Olson (94), have been interested in *individual* consistency over a period of time. The results for the tests at the beginning and the end of the period have been expressed in terms of ranks, percentiles, individual variations from the group mean, and per cents from the median, and the individual differences at the two testings were checked to determine which traits were most consistent in the individuals observed. Out of the large number of traits observed by these researchers the only ones found to be particularly consistent by this method of individual analysis were social and verbal responses, total-vocalization, and nervous habits.

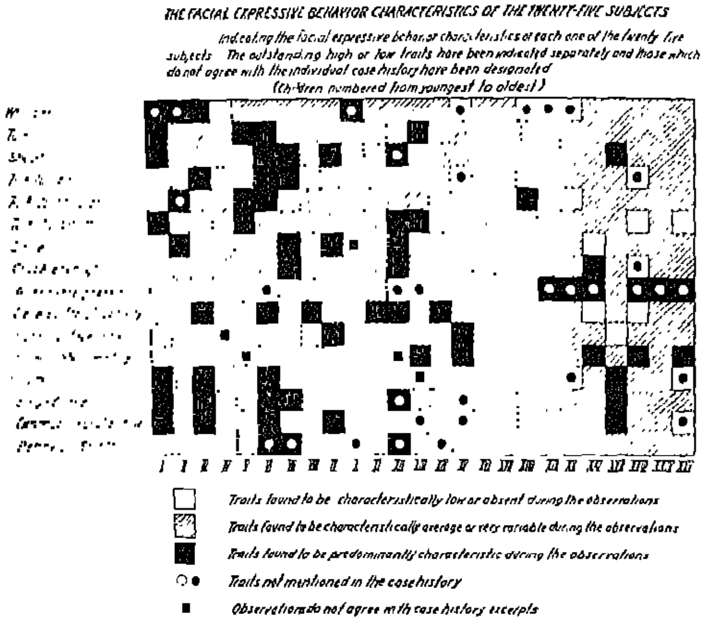
Another closely allied method was used by Landis (79, 80), Berne (14), Allport and Vernon (4), Brackett (22), Arrington (6), and McCarthy (87), namely to study the frequency of certain reactions of individuals in different types of situations. This analysis was therefore individualistic in character, but so few traits and individuals were studied that conclusions had to be expressed in very general terms. Allport and Vernon aptly sum up the findings for these investigators, "Fundamentally our results lend support to the personalistic contentions that there is some degree of unity in personality, that this unity is reflected in expression, and that for this reason acts and habits of expression show a certain consistency among themselves" (4, p. 171). Although the other investigators had to draw their conclusions in general terms, only Brackett (22) and Arrington (6), observing a larger group at different times, could establish statistically a consistency in laughter responses. Research in the field of expressive movement probably has not yet reached such a point of proved reliability that it may be used as a general method of study, but it has excellent possibilities as a means of showing individual expressive behavior consistency.

Still another method of determining consistency, both of the individual and the group, is to compare an individual's reactions or the average of a group of individual reactions from observation to observation in a series of records. McCarthy (88), and Schubart (107), working in the field of language, Washburn (124), and Jones (68) in smiling and laughing, Duffy (40, 41), in nervous tension, Langfeld (81, 82), in adult judgments of facial expression; Shirley (108), and Gesell (52), in infant development, and Bayley (9), in crying, all stated that individual consistency from observation to observation was apparent, but the extent of consistency was not designated by any one but Washburn, who was able within the limits of her investigation to differentiate her subjects into expressive types. Manwell and Mengert (64), and Fisher (47), studying language, have sufficient data on each subject to figure individual consistency correlation coefficients from observation to observation, and both these studies found consistency in the frequency of language. Aside from these last two and Washburn's study, no researches could be found which treated the results in terms of individual consistency at each successive observation over a total period. Therefore, this type of treatment was undertaken in the present study as a means of confirming the consistency correlation results for the group, and to demonstrate individual differences.

A. Individual Differences with Respect to the Items of Behavier Observed

To establish the individual differences for this group of 25 subjects, the three steps outlined above were followed. The medians for all the items of behavior observed in this investigation which were comparable to those of previous studies were found to be normal for children of this age. It seemed justifiable, therefore, to use the deviation of the individual scores from these group medians to demonstrate individual differences. All individuals whose total scores fell outside the group interquartile range for each type of behavior were considered as unusual with respect to that type of behavior; the others were designated as normal. However, no individual total scores were segregated as unusually characteristic until the consistency of this behavior was checked by comparing the daily scores for each of the six observations with the interquartile range. If the daily scores also fell outside the interquartile range on more than half of the six days this was held as a criterion of a consistently high or low characteristic expressive behavior trait.

Figure 3 indicates diagramatically the facial behavior characteristics



THE FACIAL EXPRESSIVE BEHAVIOR CHARACTERISTICS OF THE TWENTY-FIVE SUBJECTS

Indicating the facial expressive behavior characteristics of each one of the twenty five subjects. The outstanding high or low traits have been indicated separately and those which do not agree with the individual case history have been designated

(Children numbered from youngest to oldest)

Traits found to be characteristically low or absent during the observations
Traits found to be characteristically average or very variable during the observations
Traits found to be predominantly characteristic during the observations
Traits not mentioned in the case history
Observations do not agree with case history excerpts

FIGURE 3

for the 16 traits observed for each of the 25 subjects. The unshaded squares indicate the consistently low behavior scores; the black areas the consistently high characteristic forms of behavior; and the lightly shaded areas that behavior which either ranged consistently within the interquartile range or was so variable that it could not be placed in the high or low classifications.[10] The non-agreement between these and the case history classifications has been designated in the appropriate places.

It can easily be seen by glancing over this chart that no two individuals had the same characteristic expressiveness. This individuality in behavior made it impossible to group these children into expressive types. It is possible, however, to pick out certain expressive patterns which differentiate members into small groupings:

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[10] In a group as small as this further segregation within this middle group was found to be impossible, and interest had to be focussed entirely upon the dominant characteristics.

1. The behavior of Subjects XVI and XVII is somewhat unusual in that there are no dominant characteristics for XVII and only one characteristically low trait for XVI. The expressiveness of both these boys varied considerably throughout the period of observations. Subject XVI changed from an essentially depressed, withdrawn, nervous individual to a happy, outgoing, sociable child who had learned to smile, talk-to-children, sing, and chant, though low scores for chuckling and laughing were maintained consistently throughout. Subject XVII changed his expressive behavior to suit his moods which shifted not only frequently from day to day, but suddenly within the same day. He was considered among the five least predictable by the two judges, so this inconsistency in behavior is to be expected in his case.

2. Three children, Subjects XIX, IV, and XIV were all individuals who used their energy in other ways than in vocal outlet. Their scores were especially low with respect to conversation-with-adults, humming, singing or chanting, and dramatic-vocalization.

3. In contrast with these, three other children, Subjects III, VI, and XXII were very reactive individuals who expended a great deal of energy in vocal outlet and whose scores for solitary talking, humming, singing, chanting, and dramatic-vocalization were particularly and consistently high. Their scores for social-talking, smiling, chuckling and laughing, however, were either variable or characteristically low.

These eight individuals could be classified from the rest of the group, not into actual expressive types, but at least according to certain characteristic expressive patterns. The unusual character of their expressive patterns, and the similarity between these patterns, helped to distinguish them from the other members of the group whose expressive behavior fell into unique individual classifications. Of these eight individuals with unusual behavior patterning, seven were those who were experiencing adjustment difficulties and had entered the group on the "prescription" basis. The other child is Subject XVII whose health failed soon after he had left the nursery. This slowly developing illness may have accounted for the increasing variability in a child whose initial stability had placed him in the "regular" group. The relation between adjustment difficulties and certain expressive personality characteristics brings up the question of causal factors. It would be interesting to know how the child's unusual expressive behavior characteristics are related to his social adjustment difficulties, and how far the conditions of maladjustment affected the expression of the child's personality. The question cannot, of course, be answered by this investigation since an adequate solution could be reached only by means of many horizontal personality studies over a period of many years. Furthermore, the relationships found may not be characteristic of all groups of maladjusted children. It is safe to say, therefore, that with this group of children, certain facial expressive personality types were characteristic of at least half the members of the group who were experiencing adjustment difficulties. The extent of the relationship, however, between the personality types and the difficulties could not be defined, merely suggested.

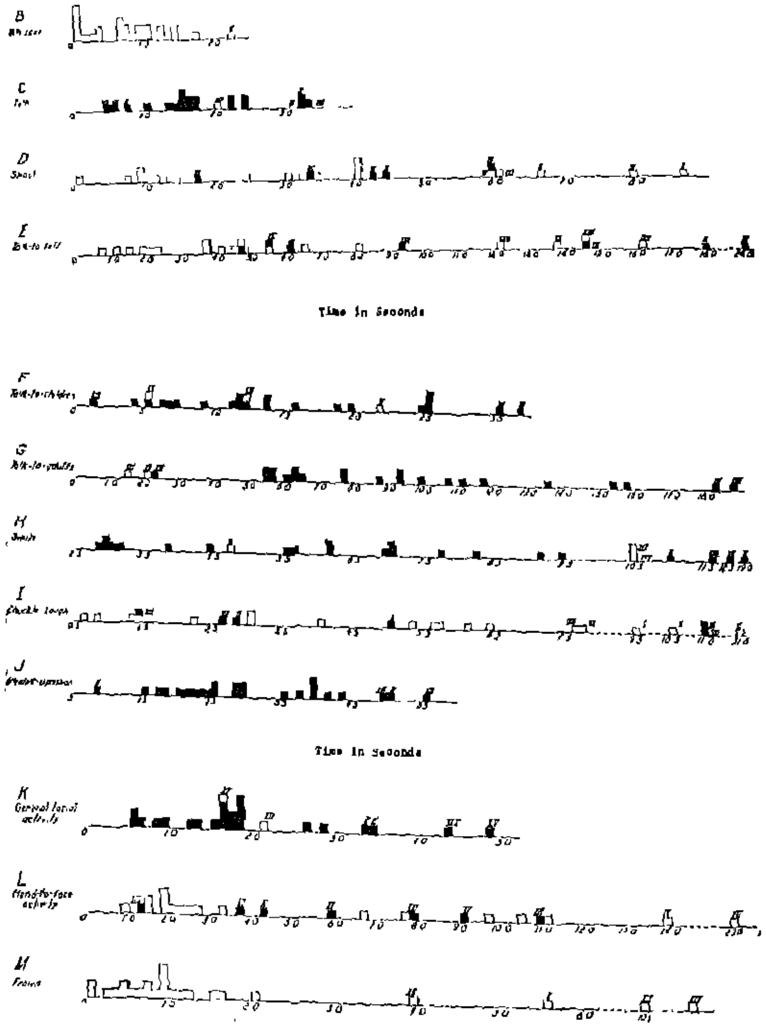
It is obvious in looking over Figure 3 that there are more consistently dominant characteristics among the older children, and that the younger children have more traits which are consistently low or absent. This difference in patterning may be partly accounted for by the age factor which is known to affect percentage amounts of talking, frowning, whimpering, and crying. Therefore, consistently large scores for talking are to be expected among the older children, as more frowning, whimpering, and crying should be found in the younger group. The factor of maturity probably also applies (but not in the same way) to general-facial-activity, humming, singing, chanting, and dramatic vocalization; in all of which consistently large scores are more often characteristic of the older members of this group. Some of the younger children had fairly large total scores for these aspects of behavior, but their behavior was quite variable from one observation to the next. With younger children the above mentioned behavior traits may be just developing, and in the process of being tried out and established as habits of behavior. They are, therefore, used more variably than those expressions which have become dominantly habitual. In this younger period, one of trial and error, so to speak, the separate individuals may still be differentiated in terms of their expressive characteristics, but these expressive patterns are not as distinct as among the older children and may change as the child grows older and different forms of expression either become more established or are discarded. This effect of age upon the individual patterns of facial expressive behavior is a second justification for not classifying all the members of the group into expressive types except in the broad general terms used. If clear cut expressive types at these age levels are affected by the variable of maturity, no typology could be devised on the basis of these results which could adequately differentiate growing individuals, and classify them as the same type at each succeeding age level. Only the general classifications such as vocal-expressive, or non-expressive, may be used, since these are applicable at all the age levels.

B. INDIVIDUAL DIFFERENCES WITH RESPECT TO VARIABILITY IN *BEHAVIOR*

In the analysis of individual differences it was found that the range of variability between the highest and lowest scores was different for each item of behavior and also different for each individual with respect to each item. By range is meant the difference, for each subject, between the highest and the lowest daily score for each of the six observations for each item of behavior. For example, Subject VIII's highest score for smiling was 4.6 on the first observation day and his lowest score was 1.7 for the same behavior on the fifth. The difference or range of variability between these is 2.9 for smiling. In contrast, Subject XI's highest score for smiling was 21.4 on the sixth day of observation and his lowest was 2.3 on the first, with a difference or range of variability of 19.1. It is possible, therefore, to distinguish these two individuals not only on the basis of the average amount they smiled as shown on Table IV, but also according to the consistency or variability of this form of behavior from one observation to the next, as shown by a small or large range.

A scatter diagram for the ranges of smiling was then made for all the 25 subjects. This diagram may be found in Figure 4, *H*. Those individuals for whom a certain amount of smiling was recorded at each of the six observations are indicated by the black squares; those who did not smile at one or more observations are represented by the shaded squares. There were only three children who had no score for smiling at one or more observations, so a certain amount of smiling during each fifteen-minute sample appears to be characteristic of this group of children. The range of variability of most of the subjects was between 2.8 and 8.9, but there were a few individuals like Subject XI, discussed above, whose behavior was particularly variable. On this chart is indicated the numbers of the three unusual children

□ = Variability ranges from zero (occasional behavior)
■ = Variability ranges above zero (customary behavior)



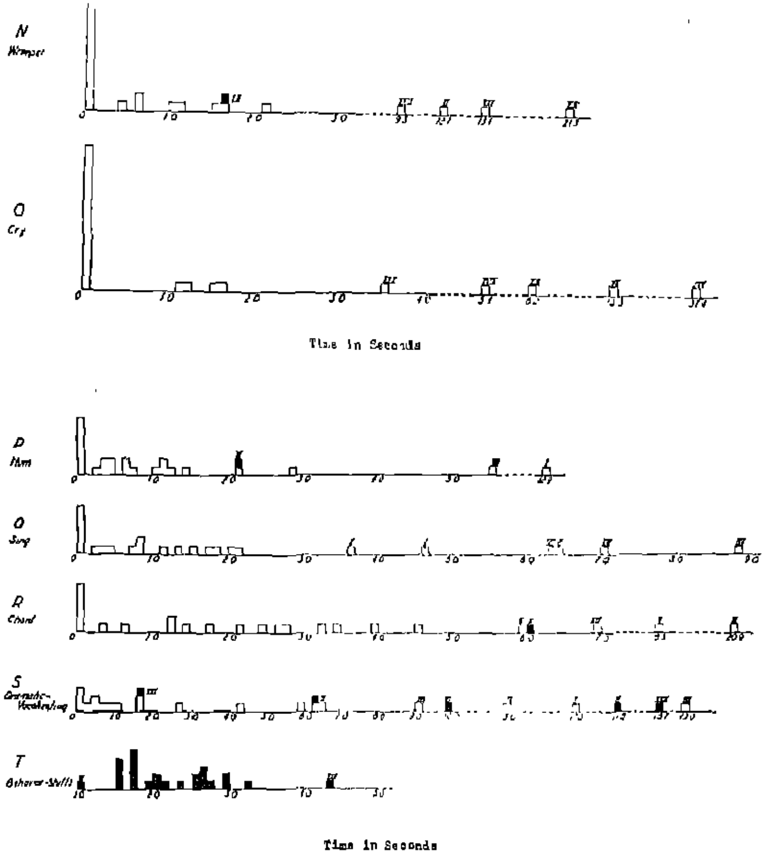


FIGURE 4

CHARTS *B-T*, INDICATING THE SCATTERING OF THE RANGES OF VARIABILITY FOR 19 ITEMS OF BEHAVIOR FOR THE 25 INDIVIDUAL SUBJECTS

who did not smile at least once every observation day plus the numbers of those whose behavior was more variable than the rest of the members of the group. It is interesting to note that all seven of these children were those who entered the group on the prescription basis (see Table 8).

TABLE 8

SUMMARY OF THE SCATTERINGS FOR THE RANGES OF VARIABILITY IN ALL THE ITEMS OF BEHAVIOR FOR ALL THE TWENTY-FIVE SUBJECTS

Behavior items	Number of children whose variability ranges from zero (occasional behavior)	Number of children whose behavior differed markedly from that of the group: Number of children in "Regular" group	Number of children in "Prescription" group	Total number of children
Whisper	25*		1	1
Talk	1	2	5	7
Shout	20*	6	4	10
Talk-to-self	18*	6	5	11
Talk-to-children	4	1	5	6
Talk-to-adults	2	3	2	5
Smile	3		7	7
Chuckle-laugh	19*	6	5	11
Attentive-expression			4	4
General-facial-activity	2	2	4	6
Hand-to-face-activity	18*	5	4	9
Frown	25*	1	3	4
Whimper	24*	1	4	5
Cry	25*	1	4	5
Hum	24*	2	1	3
Sing	25*	3	3	6
Chant	24*		5	5
Dramatic-vocalization	20*	5	4	9
Behavior-shifts			2	2

*Occasional behavior which is characteristic of more than 75% of the group.

All the items of behavior were subjected to the same method of analysis which has just been outlined for smiling. The scattering of the ranges of variability for the 25 subjects for all the items of behavior are given in Figure 4, *B-T*. Table 8 is a summary of the findings represented in these charts. In the first column is given for each item the number of children for whom this type of behavior was not recorded on at least one observation day. The starred figures in this column indicate that variability (with zero as a base), or occasional behavior[20] is characteristic of the group for certain items of behavior. The figures in this column which are not starred indicate that it is customary to observe this type of behavior at every daily observation of most of the members of the group. In the last three columns the number of children can be found whose ranges of variability do not conform to that which is characteristic of the group (see starred figures column one) or are much larger or smaller than those of most of the other members of the group. For example, in the scatter diagram for ranges in smiling, Subjects IV, XIX, and XXV were not observed to smile on one or more observation days, whereas, daily smiling is customary for the group. The ranges for smiling of Subjects II, XXIII, XIV, and XI were all far greater than those of the rest of the members of the group, indicating extreme variability in the amount these individuals smiled.

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[20] By customary behavior is meant that behavior which occurred in every daily observation of more than 75 per cent of the children. By occasional behavior is meant that behavior which did not occur at every daily observation of more than 75 per cent of the children.

According to these findings it was not difficult to characterize each expressive behavior form as either customary or occurring occasionally (but not always) with most of the members of the group. The forms of behavior which could be characterized as customary were: smiling, talking (middle intensity degree), conversing-with-children, conversing-with-adults, general-facial-activity (*"F"*), "attentive" expression, and the number-of-behavior-shifts. The rest of the facial activities were observed only occasionally in most of the children. These included 12 facial expressive forms: whispering, shouting, talking-to-self, chuckle-laugh (combined), humming, singing, chanting, dramatic-vocalization, frowning, whimpering, crying, and hand-to-face-activity (*"H"*). This segregation of the traits into "customary" and "occasional" corresponds with the findings of Bott who separated by means of a different type of analysis practically the same traits into equivalent categories calling them "common" and "individual" aspects of behavior (20).

The charts showing the ranges of variability for all the items of behavior were then analyzed to demonstrate the wide individual differences apparent in the scatterings. The subjects whose ranges of variability did not conform to those most characteristic of the group were studied individually, and certain interesting relationships were discovered. There were four children who were unusually variable in seven or more forms of behavior. Of these, the two children brought in for temper-tantrums, Subjects XIX and XXV, were variable in 11 out of 18 charts. The other two were extremely expressive, energetic boys, Subjects VI and XXI, who were also considered particularly variable by the two judges.

When the group of children who entered the nursery on the prescription basis were compared with the "regular" group, certain trends were evident which possibly suggest interesting differences between stable individuals and children with known behavior difficulties. Whereas a certain number of the prescription group (see Table 8) were unusually variable in every form of behavior to about the same degree, the "regular" group were variable in only a few traits. Not a single one of the children chosen for their stability was unusually variable with respect to smiling, whispering, chanting, "attentive"-expression, and the number-of-behavior-shifts. Half or more of this group, however, were inconsistent, which is probably normal, in those types of behavior considered as verbal tics or mannerisms by previous investigators. These were: shouting, chuckle-laugh, talking-to-self, dramatic-vocalization, and hand-to-face-activity ("*H*"). In comparing the "regulars" (see Table 8) who were variable in each type of expressive behavior with those of the prescription group, larger percentages of children in the latter group were extremely variable in whimpering, crying, talking (middle intensity degree), conversing-with-children, smiling, chanting, "attentive"-behavior, and the number-of-behavior-shifts. This suggests that extreme variability in these items may be indicative of problem tendencies.

Consistency in certain types of facial expressive behavior seemed, therefore, to be characteristic of children who did not appear to have adjustment difficulties and for whom everything seemed to be going smoothly. Extreme variability in these types of facial expression seemed to be characteristic of children who were experiencing difficulties in making social adjustments. It must be kept in mind, however, that these observations were taken over a comparatively long period of time, and the increased variability in the prescription group may be more a function of this temporal factor than of personality differences. If the observations had been taken on both groups over a shorter period, it would be possible to conclude from these results that extreme variability is characteristic of children with behavior difficulties as compared with professedly stable individuals. On the other hand, since all the children were observed for approximately six months, this time factor has been controlled to a certain extent for all the members of the group. During this time, each member of the group had made adjustments to the nursery school environment, and in this period of adjustment those children in the regular group remained characteristically stable and consistent in certain forms of behavior. They varied the other aspects of their behavior either to meet the exigencies of situations that arose in the nursery (such as shouting and laughing during excitement, crying when hurt, and dramatic vocalization when playing with certain toys) or in consequence of the normal development of more mature expressive behavior patterns of response (such as increased humming and singing, and conversing-with-children as they grew older).

On the other hand there were no facial expressive items in which the prescriptions children were consistent as a group. The extreme variability of this group in all the items may be due to one or both of two reasons. The behavior of the prescription children, like that of the above mentioned regular group, was subject to changes with maturity and adjustment. For most of these children, more than with the control group, new social techniques such as smiling, and conversing-with-children, were established in the place of whimpering, crying, and talking-to-self. This progressive change toward increased sociability was especially noticeable in the scores of Subjects III, XI, XVI, XIX, XXIII, and XXV.

Table 9, indicating the daily scores of Subject XXV, shows a gradual increase in talking, chuckling, singing, and chanting, over the six month period. The crying and severe temper-tantrums at first characteristic of this child are no longer present. The daily scores of the other five children mentioned are similar to those for Subject XXV and so are not given here.

In the process of the adjustment of these six individuals, therefore, their scores on the first observation days were very different from their scores on the last, and the unusual character of this difference gave them the appearance of being extremely variable. There were only two children, Subjects X and XV, both in the prescription group, who made progressively poorer adjustment during the year, and here again the factor of time caused them to be variable, but in an opposite way from those whose behavior progressively improved. These were two very immature individuals who were very dependent upon adults. They were very social at first, but were unable to adjust to the attitude of self-independence fostered in the nursery and gradually became non-social during the year. Table 10, the daily scores for Subject XV,

TABLE 9

SUBJECT XXV

PERCENTAGES OF DURATION OF TIME FOR EACH CATEGORY OF BEHAVIOR FOR EACH FIVE-MINUTE OBSERVATION

Date (1934-35) and age in months	No. observation	Whisper	Talk	Shout	Smile	Chuckle	Laugh	Attentive	Facial	Hand and face	Frown	Whimper	Cry	Hum	Sing	Chant	Vacant	Dramatic	"A"	No. behavior shifts
11-27	1		6.5					78.2					1.3						14.2	21
27	2		3.3					86.4											9.3	6
1-15	1							4.5		1.0	24.2	27.7	42.6							8
29	2							5.7			10.2	11.5	69.7						2.9	6
	3							91.1											8.9	1
2-12	1		1.7		8.1			76.5	5.1										8.8	14
30	2		7.1		13.7		2.7	62.6	1.0									1.5	11.7	26
	3	2.0	8.9		9.3			59.6	3.3		1.0								15.9	30
3-15	1		4.0		1.3		0.7	80.7	12.3	1.0										15
31	2		1.6		1.0		2.0	67.2		9.5		4.6	2.3						11.8	12
3-22	3		13.7		6.2		0.7	44.3	3.3	20.8									11.1	37
4-19	1							96.7	1.3										2.0	3
32	2		7.1		1.6			58.4	7.8	15.6									11.4	29
	3		22.5	7.1	18.0	2.9	9.0	11.2							6.1	20.6			2.6	52
5-17	1	1.7	32.9		7.7	2.3	1.3	34.3	14.1	0.3					3.0				2.3	56
33	2		21.5		11.6	4.8	8.2	50.3	18.1	1.4									4.1	61
	3		4.9		8.2			58.8	15.4	4.2	0.7								7.8	27

TABLE 10

SUBJECT XV

Percentages of Duration of Time for Each Category of Behavior for Each Five-Minute Observation

Date (1935-36) and age in months	No. observation	Whisper	Talk	Shout	Smile	Chuckle	Laugh	Attentive	Facial	Hand and face	Frown	Whimper	Cry	Hum	Sing	Chant	Vacant	Dramatic	"X"	No. behavior shifts
9-23	1		41.0		6.0	2.0		41.7											9.3	38
36	2		39.6	3.0	9.0	5.3		39.2		2.7									1.3	45
9-25	3		22.4	7.3	9.0	2.7	4.0	26.7	12.3	12.0									3.7	60
10-21	1		9.9		15.9	1.0	6.6	44.7	7.0	1.3									13.6	39
37	2		5.9		5.3	5.6		63.1		5.9									14.2	31
	3		6.1	1.9	8.7	2.6		60.0	4.5	4.2									10.3	42
11-18	1		27.2		3.5			39.8		17.9	3.3	6.7							1.7	40
38	2		4.1					14.6				25.4	40.0						15.9	16
	3		4.3					67.3	5.0										23.3	12
1- 8	1		2.0		0.7			63.2	23.4										10.7	21
39	2		4.0					66.1	9.3	12.0				1.7					7.0	30
	3		0.7					47.3	23.7	26.3	0.7								1.3	46
2- 5	1		4.7	3.6	2.3			84.8	2.3	2.3										32
40	2		8.0	1.3				76.7	0.7	1.3									12.0	27
	3		2.3		2.0			62.0	5.7	11.7	1.0								15.3	22

TABLE 9

SUBJECT XXV

PERCENTAGES OF DURATION OF TIME FOR EACH CATEGORY OF BEHAVIOR FOR EACH FIVE-MINUTE OBSERVATION

Date (1934-35) and age in months	No. observation	Whisper	Talk	Shout	Smile	Chuckle	Laugh	Attentive	Facial	Hand and face	Frown	Whimper	Cry	Hum	Sing	Chant	Vacant	Dramatic	"A"	No. behavior shifts
11-27	1		6.3					78.2					1.3						14.2	21
27	2		3.3					86.4											9.3	6
1-15	1							4.5		1.0	24.2	27.7	42.6							8
29	2							3.7			10.2	11.5	69.7						2.9	6
	3							91.1											8.9	1
2-12	1		1.7		8.1			76.3	3.1										8.8	14
30	2		7.1		13.7		2.7	62.6	1.0									1.3	11.7	26
	3	2.0	3.9		9.3			39.6	3.3		1.0								15.9	30
3-15	1		4.0		1.3		0.7	80.7	12.3	1.0										15
31	2		1.6		1.0		2.0	67.2		9.5		4.6	2.3						11.8	12
3-22	3		13.7		6.2		0.7	44.3	3.3	20.8									11.1	37
4-19	1							96.7	1.3										2.0	3
32	2		7.1		1.6			58.4	7.8	13.6									11.4	29
	3		22.5	7.1	18.0	2.9	9.0	11.2							6.1	20.6			2.6	52
5-17	1	1.7	32.9		7.7	2.3	1.3	34.3	14.1	0.3					3.0				2.3	36
33	2		21.5		11.6	4.8	8.2	30.5	18.1	1.4									4.1	61
	3		4.9		8.2			58.8	15.4	4.2	0.7								7.8	27

TABLE 10

Subject XV

Percentages of Duration of Time for Each Category of Behavior for Each Five-Minute Observation

Date (1935-36) and age in months	No. observation	Whisper	Talk	Shout	Smile	Chuckle	Laugh	Attentive	Facial	Hand and face	Frown	Whimper	Cry	Hum	Sing	Chant	Vacant	Dramatic	"A"	No. behavior shifts
9-23	1		41.0		6.0	2.0		41.7											9.3	38
36	2		39.6	3.0	9.0	5.3		39.2		2.7									1.3	45
9-25	3		22.4	7.3	9.0	2.7	4.0	26.7	12.3	12.0									3.7	60
10-21	1		9.9		15.9	1.0	6.6	44.7	7.0	1.3									13.6	39
37	2		5.9		5.3	5.6		63.1		5.9									14.2	31
	3		6.1	1.9	8.7	2.6		60.0	4.5	4.2									10.3	42
11-18	1		27.2		3.3			39.8		17.9	3.3	6.7							1.7	40
38	2		4.1					14.6				25.4	40.0						15.9	16
	3		4.3					67.3	5.0										23.3	12
1- 8	1		2.0		0.7			63.2	23.4										10.7	21
39	2		4.0					66.1	9.3	12.0				1.7					7.0	30
	3		0.7					47.3	23.7	26.3	0.7								1.3	46
2- 5	1		4.7	3.6	2.3			84.8	2.3	2.3										32
40	2		8.0	1.3				76.7	0.7	1.3									12.0	27
	3		2.3		2.0			62.0	5.7	11.7	1.0								15.3	22

has been inserted as an example of the change in behavior of these two children.

In contrast to the above mentioned children whose variability may have been due to developmental maturity and adjustment, there were a few children like Subjects II, IX, and XX, whose behavior varied from one day to the next and whose extreme variability may be considered as a personality characteristic. Whereas the other children were fairly consistent within each phase of a progressive process of adjustment, the behavior of these three subjects varied so extremely from day to day and from hour to hour that inconsistency is probably a fundamental attribute of their personalities.

In concluding this section on variability, it may be said that though distinct individual differences in variability were found among the 25 members of this group, in most of the children this variability seems to be a function of change in adjustment either over a period of time or to unusual situations arising in the nursery environment. In only three cases could extreme variability be considered as a personality characteristic.

C. INDIVIDUAL DIFFERENCES WITH RESPECT TO CHOICE OF PLAY MATERIALS

It was suggested in Section IV that the choice of play materials may be related to individual differences in expressive behavior. But, since the materials used by all the subjects during the six months' observation could not be accurately recorded, it was impossible to indicate which toys were used most often by each of these children. Because the choice of material could not be controlled, relationships between the individual expressive behavior patterns, and the individual choice of material could not be made by comparing the latter to the former.

When, however, emphasis was placed both upon the facial expressions in general and the relation between them and certain types of material, it was found that the more intense vocalizations such as shouting, singing, chanting, and dramatic-vocalization, were associated more frequently with the moveable toys and the Jungle Gym. Six boys, Subjects III, VI, VII, XVI, XVII, and XXII, were noted when Table 6 was compiled, who played almost exclusively with the movable toys. These six proved to be among the eight most vocally expressive children in the group. It would seem, then, that the expressiveness of these children was related to their choice of material.

No clear cut conclusions, however, may be drawn from this brief discussion because the observational limitations made it impossible to record the material being used as accurately as the facial expressions, and any relationhips found should be conidered merely as tentative suggestions. Since direct relationships were merely intimated between expressions and certain types of material, it does not seem justifiable to conclude that the choice of toys causes the facial expression, but rather that both are a function of the fundamental expression of the personality of the individual.

D. SUMMARY

In this section the individual differences with respect to the separate items of facial expressive behavior observed in this study were indicated in terms of the deviation of the individual's total scores around the group median. The individual expressive patterns were found to be fairly unique for each of the 25 subjects, making it impossible to group them into types except in very general terms. A new method of analysis based on the range of variability from observation to observation also crystallized the differences between the 25 subjects, but reasons for these differences were suggested other than innate personality differences. The factors of maturity and problem tendencies may be very important in determining individual variability. Since this was necessarily an exploratory study, the relationships suggested between expressive types, variability, problem tendencies, and choice of material, should be further investigated and confirmed in controlled studies of larger groups of children. The establishment of such relationships might make it possible to determine, as it was impossible to do in this study, which facial expressive behavior forms are innate personality characteristics and which are most subject to modification in physical and social adjustment.

VI. EVALUATION OF THE TIME-SAMPLING TECHNIQUE FOR THE STUDY OF INDIVIDUAL DIFFERENCES

Certain advantages and disadvantages of the time-sampling technique as used in this investigation became apparent as the study progressed. Various new aspects of the method, procedure, and expression of results in this technique were found to be helpful in studying individual differences in facial expression; others were detrimental. All will be outlined briefly, and an evaluation made of the technique in the light of these findings.

One aspect of the method which proved very satisfactory in making observations, and one which has been used in only one or two other studies;—namely, reducing the time unit of observation to single seconds, was advantageous in studying forms of behavior which occurred infrequently such as laughing, crying, and singing. However, even with this refinement, it was found that many of the forms of behavior occurred so infrequently that the number of time-samples may have been too few to tap the entire repertoire of a child's facial expressions and so to give an adequate picture of his behavior. A longer total period of observation would almost certainly have given more valid results. Furthermore, it was found practically impossible to make a record where the child's face was visible during every second of the whole five minutes of each observation; and this fact led to certain mathematical difficulties in expressing the results. However, possible suggestions were made which might easily offset these problems and make further investigations more reliable.

The observations being taken at lunar month intervals over the period of six months made it possible to check individual consistency by comparing a child's pattern of expressive behavior at each of his observation days throughout the series, and this proved to be an excellent aspect of the procedure. A more complete miniature, however, of each child would have been obtained if the social, material, and general body activity, also, could have been included.

Notwithstanding the fact that in the present study, as outlined, the method and procedure differed in some ways from those of previous investigations, the results were found to be just as reliable. Moreover, the method and procedure being objective and not influenced by the difficulties of interpretive judgment gave records of observations which showed a high correspondence when made simultaneously by two trained observers.

Descriptive reports on nine children were made by the nursery teacher on the exact days of the six lunar months when the observations of this study were made on these same nine children. This afforded a unique opportunity to check the validity of the results by comparing the daily sample of the investigation with the nursery reports. Moreover, the validation of the individual *total* ninety-minute sample was confirmed by means of close comparisons between the clinical case reports for each child, the individual rankings of two judges, and the total scores for each of 24 of the subjects. The objective results of this study were found to give valid pictures of a child's expressive characteristics, and to differentiate correctly each individual on the basis of outstanding and persistent patterns of behavior. In the comparisons for one child, however, the objective scores showed poor correspondence. This fact suggests that every child should be observed in several types of situations in order to tap adequately the expressive characteristics of those who do not react in the same way in all situations.

Furthermore, in this study, the attempt was made for the first time to express the results in terms of variability from observation day to observation day. Marked individual differences were noted in the ranges of variability for each subject for each item of behavior. This aspect of the analysis of the results suggests that, in picturing a child's expressive behavior, not only should he be tested in several types of situations, as suggested above, but also many more observations scattered over the experimental period would be required to be sure of ascertaining the total characteristic behavior of a particularly variable individual. The factors of mental, physical, and social maturity, as well as of different environmental conditions may affect the expressive behavior of some individuals more than others. To get adequate samplings, therefore, of the expression of the whole personality, a long period of time and varying situations should be tested. If this be true, the efficacy of the time-sampling method as a simple, short, clinical tool is lost to a certain extent.

If the time-sampling technique is to be used in the future as a clinical tool, not only should age and sex norms be established in scoring the separate items of facial expressive behavior, but also norms should be established for ranges of variability in all the items of behavior. Many of the younger children were more variable in certain of the more mature forms of behavior, such as talking-to-children and singing, or were completely inexpressive and therefore not variable at all in these items. Since this was found to be true, it is impossible, at this time, to judge whether unusual variability of certain expressions or the absence of them is due to immaturity or to personality characteristics. The expressive characteristics of the younger children (two to three and one-half years) could be individually differentiated only in terms of smiling, talking, and crying. The expressive characteristics of the older children were differentiated not only on the basis of their scores in these three types of behavior but also according to their scores in the other expressive forms, such as humming, whispering and singing, which are more likely to become established during the process of growth.

With these advantages and disadvantages of the time-sampling technique in mind, it is somewhat difficult to make a clear cut evaluation of it as a possible clinical tool. The method was found to be reliable, valid, and capable of accurately differentiating individuals in terms of their expressive behavior either for any one day or over a period of six months. Technical difficulties in method and procedure can be avoided and perhaps efficiency can be improved with respect to length of time and varying conditions to be tested. Certain norms, however, in expressing the results, especially in terms of variability, should be established before it will be possible to determine to what extent the individual facial expressive behavior of preschool children is a function of many variables such as maturity, sex, social adjustment, and situation, or is influenced by innate personality characteristics.

Since certain relationships were suggested in this investigation between facial expressive types, variability in behavior, and problem difficulties, there may be an optimum range of variability in behavior for each of the expressive behavior forms studied, beyond which physical or social maladjustment is indicated. Norms of expressive types as well as the optimum range of variability in behavior might prove useful, when established, in the study of preschool groups too large to study individually. If there proves to be a direct relationship between certain expressive personality characteristics, or variability in behavior, and inability to make adequate social adjustments, observations along the lines of this study on a group of children might bring to notice those children who were headed toward adjustment difficulties. By giving them special guidance and training, it might be possible to prevent them from presenting habitual problems during their first school years.

VII. SUMMARY OF THE RESULTS

The facial expressions of 25 preschool children were studied monthly over a six months' period. The time-sampling technique was employed in connection with the Becker time-marker. This device yielded a record for each second of observation. There were three five-minute observations on the same day for each individual at each monthly observation. The problem which arose in this study of securing a full five-minute sample of behavior can be avoided in the future by lengthening each interval of observation so that those periods when the child's face is turned away from the observer no longer figure in the analysis of the results.

The reliability of the method proved to be high according to 15 simultaneous observations made by two observers. The coefficients of correlation between the odd and the even observations, and between a single observation and the total were equivalent to comparable coefficients found by other investigators.

A. GROUP RESULTS WHICH AGREED WITH THE FINDINGS OF OTHER INVESTIGATORS

1. The comparisons between the medians of the present group and averages previously determined not only on groups of three year old children but also on preschool groups (all ages combined) indicated perfect agreement in laughing, crying, and talking. The present medians in whispering, shouting, and singing, agreed with other findings on preschool groups where no differentiations were made in terms of age.

2. The scatter diagrams showed the same increase with maturity which others have found in the categories: talking-to-children, talking-to-persons, and total-vocalization; and the same decrease with age in whimper-cry and hand-to-face-activity ("*H*"). These trends were confirmed by significantly high positive rank correlation coefficients between age and the categories of behavior which were found to increase with maturity, and significantly high negative relationships between age and the items which decreased.

3. It was found that the girls did not use any form of expressive behavior more than boys, but larger percent scores were recorded among the boys in talking-to-self, hum-sing-chant, dramatic-vocalization, and total-vocalization. In other words there was a tendency for

boys to employ more of the non-comprehensible, non-conversational vocalizations than girls. Furthermore, a scatter diagram for talking-to-children indicated no marked sex differences. It seems, therefore, that, though boys tend to indulge in solitary vocalizations more than girls, they tend to have equal amounts of social vocalizations.

4. Positive rank correlation coefficients were found between smiling and chuckle-laugh and between all three of these and attendance. Positive relationships indicated that those who frown are also more likely to whimper and cry; and that those who talk-to-persons also tend to chuckle and laugh. The three indices of body build (*weight/height*, *weight/height*^{2}, and *weight/normal weight*) were positively correlated with chuckle-laugh and negatively correlated with talking-to-self. Talking-to-persons correlated positively with *weight/height;* and whimper-cry with *weight/height*^{2}. In other words, the stockier, fatter, pycnic body types tend to be more sociable, extraverted, and expressive.

B. Group Results Which did not Entirely Agree with Previous Findings

Pertaining to the controversy over the relationships between facial activity and vocal outlet, small but consistently negative rank correlation coefficients were found between the combination of "*F*" (facial-activity) and "*H*" (hand-to-face-activity) and the five combinations of the vocal expressive items; i.e., whimper-cry, chuckle-laugh, vocal-outlet, intense-vocal-outlet, and total-vocalization. The findings indicate that there may possibly be a tendency for those children who are more vocally expressive to resort less to the silent facial movements.

C. New Interrelationships

New interrelationships between several of the items of behavior and other factors were found which may be later confirmed by more controlled studies.

1. The number-of-behavior-shifts was found to increase at the end of the morning. This finding illustrated in a new manner the stimulating effect of the nursery school environment which others have noted previously.

2. The various types of non-social vocalization (such as talking-to-self, hum-sing-chant, and dramatic vocalization) seem to be related.

3. A connection is suggested between intelligence and facial motility.

4. Relationships are suggested between whispering or humming, and the more quiet occupations; and between shouting, chanting, noisy vocalizations and the more active occupations and situations, such as those involving the use of movable toys.

5. Location and attendance seemed to influence the amounts of the facial expressive behavior, but no definite conclusions could be made for it was impossible to control the other variables of age, sex, type of material, and time of day, all of which may also affect the behavior scores.

6. Relationships were found between single personality characteristics of the 25 children as judged by the nursery attendants and the present scores in certain of the facial expressive behavior items. The objective scores for talking-to-adults and talking-to-children corresponded respectively with rated adjustment-to-adults, and to-children. Hyperactivity, noted in certain children by the judges, seemed to be positively related to facial motility and negatively related to hand-to-face-activity (such as thumb-sucking and chewing-on-material).

7. Slight relationships were found between the rankings of the group by two judges with respect to social adjustment and ranking of the group according to scores for social talking.

8. No relationships were found between either judged predictability or judged tenseness and the objective scores.

D. THE VALIDITY OF THE TIME-SAMPLING METHOD

In the analysis of the results, a close correspondence was found between the case history excerpts, the ratings for all the 25 subjects by two judges who worked with the children in the nursery, the detailed nursery reports for nine selected subjects, and the facial expressive behavior scores for each child. Ninety-one percent of the observed items were found to agree with like behavior reported in the case histories. Furthermore, the type and frequency of the nervous habits observed during this study were practically the same as those reported both in the case histories and by the two judges. This high correspondence demonstrated the validity of the method and the ability of a 90-minute sample taken at intervals over a period of six months to give a true picture of the expressive behavior characteristics of the subjects observed.

The validity of the shorter 15-minute samples was confirmed when a high correspondence was found between the daily detailed nursery reports for nine selected children and the daily observation scores for the same children over the six months' period. This finding suggests that not only the 90-minute, but also the 15-minute samples, may be considered valid representations of the span of time covered, six months in one case, a day in the other.

E. Individual Differences

To illustrate the individual differences in items of facial expressive behavior, the individual scores were compared with the group interquartile range. Those which fell outside this range were considered either unusually high or low, those within it as normal. The 25 children were then differentiated in terms of these unusual deviations. Since age is a factor which enters into the determination of the amount and character of facial expression, and since the expressive patterns for the 25 individuals were all different, it was difficult to group the children into expressive types except in broad, general terms such as vocal-expressive and non-expressive.

A new method of analysis based on the range of variability in behavior was attempted in this study and was found to be capable of differentiating individuals. Scatter diagrams of the ranges of variability in all the items of facial behavior of the 25 subjects indicated certain items which were consistent for the group. These were found to be smiling, talking (middle intensity degree), conversing-with-children, conversing-with-adults, general-facial-activity, attentive-expression, and the number-of-behavior-shifts.

Certain relationships were suggested between the expressive types mentioned above (i.e., vocal and non-expressive), variability, and physical or social adjustment difficulties, which might be confirmed in more controlled investigations on larger groups of children. It was intimated that the individual expressive differences found in this study may be affected by the factors of age, sex, choice of material, and problem tendencies, as well as by innate differences in personality. When the functions of these many variables have been segregated, and when norms of the expressive types and the optimum range of variability have been determined, it may be possible to use this short time method as a tool in clinical studies to diagnose potential adjustment difficulties and to prescribe certain re-educative procedure for preschool children who have known problem tendencies.

F. CONCLUSION

It was possible to make a tentative evaluation of the time-sampling method as a possible clinical tool for the study of individual differences. Except for one or two minor technical and methodological difficulties which arose in this study, and which can easily be handled in future researches, the method proved to be very satisfactory. The procedure was found to be reliable and valid, and the results to be accurate and characteristically different for each of the 25 individuals.

APPENDIX A

CATEGORIES OF BEHAVIOR AND SYMBOLS

The following is a brief discussion and definition differentiating each behavior category used in the present study.

"*A*" . . . *Attentive-expression*,—indicates that the child is attentive to observable stimuli, either persons or objects. This is a neutral, natural expression, involving no muscular movement.

"*V*" . . . *Vacant-expression*,—indicates that the child is attentive to no observable external stimuli.

"*T*" . . . *Talking*,—may be defined as all meaningful vocalization with conversational intent. It covers all talking whether it is solitary or with children and adults. Other vocalizations, such as word play, imitation of noises, singing, chanting, squealing and grunting, are taken care of under different categories. In the cases where a child starts talking and then becomes interested in word play, the category "*T*" is changed to another appropriate category,—either "*S*" (singing and chanting), or "*D*" (dramatic vocalization). This category, "*T*", is further differentiated in terms of three degrees of intensity by recording separately whispering, talking, and shouting (length of line denoting intensity.) Low or quiet talking is included with whispering, because whispering, or sounds not vocalized, were observed only a few times in four-year-old children. These three intensity degrees are relatively easy to record and are capable of differentiating individuals on a qualitative basis.

"*D*" . . . *Dramatic-vocal-expression* covers all the non-tonal vocalizations which cannot be classed as vocalizations with conversational intent or as rhythmical singing or chanting; such as,—loud non-verbal squeals; grunting; animal noises; truck and fire engine noises; imitations of train and engine sounds; "boom," "crash," "bang" when blocks fall down or the child fires an imaginary gun; "darn," "ugh," and other interjections. Not being able to classify differences by length of line, at the end of each five-minute observation, a notation is made of the types of dramatic vocalization which were employed.

"*S*" . . . *Singing*,—indicates tonal, rhythmical vocalizations. This category is further differentiated in terms of three degrees of intensity by recording separately humming, singing, and chanting (length of line denoting intensity). The difference between these three is easily recognizable. Humming is a non-verbal form of singing and is accomplished with the mouth closed, and the head cavity used as the chief resonator. Singing includes all the attempts to reproduce actual songs whether the tune is accurate or not, and, also, to designate any time a child makes up a tune to his own words. Chanting covers rhythmical shouting which usually maintains a single tonal pitch with vocal accompaniment of one or two words such as "ding-dong" repeated again and again. It often develops from an original "*D*" form of behavior, and is usually loud.

"*L*" . . . *Laughing*,—may be defined as the muscular movements of the face indicating the overt expression of pleasure (implied). This category is further differentiated in terms of three degrees of intensity by recording separately smiling, chuckling, and laughing (length of line denoting intensity). Smiling is a silent expression and is characterized by the drawing up of the corners of the mouth. It was found to be a very consistent and familiar mode of response and this regularity of pattern differentiates it easily from general facial movements to be discussed under "*F*". Chuckling and laughing are smiles accompanied by different degrees of vocalization. Chuckling is of of a lower pitch than laughing, usually briefer in duration, and is accompanied by normal talking. Laughing is of a higher pitch, occurs when there is greater than normal activity, and is associated with shouting and squealing.

"*C*" . . . *Crying*,—indicates the overt expression of discontentment (implied). This category is further differentiated in terms of three degrees of intensity by recording separately frowning, whimpering, and crying. The lowest degree covers the milder forms of overt displeasure such as frowning, pouting, initial tears shed without any vocal accompaniment, and the early and final stages of crying, when the child's lower lip is trembling or he is snuffling. Whining, whimpering, groaning, and all cases in which tears are accompanied by intelligible talking, are included in the middle degree of crying. This is easily differentiated from the other various forms of vocalization because of the presence of tears. Loud crying, sobbing, and angry or fearful shouting with tears are the types of behavior covered by the highest degree of "C".

"*F*" . . . *Facial-activity*,—is defined as any miscellaneous activity of the muscles of the face. This includes such items as: lifting eye-brows, puckering face (often observed when the child faces the sun), opening and closing mouth without vocalization, chewing tongue, mouthing tongue with effort (almost invariably seen when children are learning to cut,—their jaws clamp down on their tongues synchronously with the movements of their fingers manipulating the scissors and paper; also observed in many other situations involving concentration combined with effort); also grimaces and imitations of animal or adult expressions; or eating and chewing during an imaginary feast.

"*H*" . . . *Hand-to-face-activity*,—covers all facial muscular activity involving contact either with other parts of the body or other objects or persons. For example, under this category is included such behavior as: thumb or finger sucking; rubbing chin, eyes, nose, etc.; pushing hair away from eyes; leaning face on hand, knee, chair or other object; chewing paint brush handle, blocks, book, or sweater; blowing or picking nose, and drinking out of a cup or using a spoon during imaginary play (where actual contact with the face is present; if there is mouthing without actual contact, the category "*F*" is used).

"=" . . . This symbol is used to indicate that the child is referring his behavior to other children.

"<" . . . This is the symbol used in the same context as "=" to indicate that the child is referring his behavior to adults.

"T=+" . . . This symbol signifies that the child is replying to a conversation initiated by another child.

"T>+" . . . This symbol signifies that the child is replying to a conversation initiated by an adult.

"T>" and "T=o" . . . These are symbols used to indicate conversations initiated by, (*a*) other children, or (*b*) adults, conversations to which the child under observation does not reply either immediately or at all. These items could not be entered accurately on the records because of the limits of time, and were inserted in addition to recording the behavior of the subject merely as orientational devices to aid in making out the final descriptive summary at the end of each five minutes.

The following is an example of how these two categories are used. Child XXV was approached by an adult while she was crying, but did not reply.

The duration of the adult's conversation is approximately represented by the symbol "$T>$" followed by a line. These are placed immediately above the checks for crying. A few seconds later another child spoke to her with no response and the same technique was used with the symbol "$T=o$". These two categories help either to explain the child's subsequent behavior, or to analyze further a period wherein there are no individual symbol changes to describe what is going on during the five minutes.

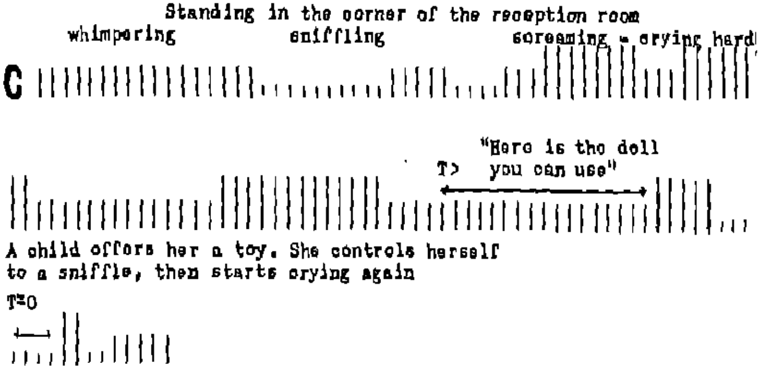
Standing in the corner of the reception room
whimpering
sniffling
screaming - crying hard
C
"Here is the doll
T> you can use"
A child offers her a toy. She controls herself
to a sniffle, then starts crying again
T=0

FIGURE 5

SUBJECT XXV

"/" . . . Is the symbol used in connection with "T" to simplify the recording of those times when the child being observed converses back and forth several times with some other child. It indicates that the other child is talking and is employed as a symbol only when the subject is listening with an attentive expression and there is no muscular activity of the face. If the subject smiles or frowns while the other individual is talking, the symbols representing these types of behavior are inserted and the symbol "$T=o$" placed above the recording as has already been explained, to indicate, approximately, the extent of the other child's conversation.

The "/" symbol and "$T\approx o$" and "$T>$" were used in this study merely as recording devices and, because of the limits of time, could not be entered accurately on the records. Since these symbols proved to be mere approximations, and cannot be included as facial expressions of the subject under observation, they will not be used in the final analysis of the results. It will not be possible, therefore, to check reliability by the subject-object ratio as Loomis (147) did in her study.

"Λ" . . . This symbol is used every time the face of the child is so turned away that it cannot be seen, or that both eyes are not visible to the observer.

APPENDIX B

RELIABILITY

1. *Reliability of the Device in the Hands of the Observer (Nature of the Instrument).*

To indicate the reliability of the observer in the use of the device, tabulations were made: (*a*) of how often the stop watch was halted at the end of a time period other than exactly 300 seconds; (*b*) of the number of times the second-notations, i.e., symbols and lines (recorded by the observer) did not coincide with the number of seconds according to the stop watch. Table 11 indicates the timing errors; Table 12, the second-notation errors.

TABLE 11

TIMING ERRORS

Period in seconds registered by stop watch	1934-35	1935-36	Total
240" — 269"	5	1	6
270" — 299"	1		1
301" — 329"	13	16	29
330" — 359"	6	2	8
360" — 390"	5		5
Total	30	19	49

TABLE 12

SECOND-NOTATION ERRORS

The total number of symbols and lines for all the records correctly timed by the stop watch

Total symbols and lines	1934-35	1935-36	Total
310-311	4	7	11
305-309	41	23	64
301-304	47	66	113
300	55	42	97
295-299	33	22	55
290-294	40		40
Total	220	160	380

Out of the total 429 records, in 49, or 11 per cent, there was an error in the stopping of the stop watch (see Table 11). Over half of these errors were within 30 seconds of the rquired 300; the other half were within one minute. This represents a fairly large deviation in timing in these few cases. Since the results, however, were expressed in terms of percentages of the total number of seconds timed, and not in terms of frequency or number of seconds, it was felt that the five six-minute observations and the six four-minute observations could be included without materially affecting the total results. This was done only when it was necessary to fill out as complete a record as possible for those children for whom it was impossible to make other more accurate observations.[21] The other 380 records were timed exactly by the stop watch; but of these, only 97 coincided accurately with the second-notations of the observer (Table 12). However, the number of second-notations in the rest of these 380 records added up to within ±10 of the required 300, or a maximum error of only ±3 per cent.

Table 13 demonstrates these sources of error in the total number of records.

TABLE 13
Combined Timing and Second-Notation Errors

Number of records	Percentage of total	Maximum percentage error in timing	Maximum percentage error in second-notations	Maximum percentage of total errors
97	23%	0	0	0
283	66%	0	±3	± 3
29	7%	±10	±3*	±13
20	4%	±20	±3*	±23

(*A timing error is assumed to make no difference in the percentage error in second-notation.)

It can be easily seen from this table that in 89 per cent of the records the maximum possible percentage error was ±3 per cent or less, while in only 4 per cent did it exceed ±13 per cent.

About twice as many errors were made during the first series of observations as during the last. Practice in the use of the device leading to improved technique probably is an important factor here.

In both Tables 11 and 12 there were more errors of over-estimation than under-estimation. This is probably due to a difference in the bias or set

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[21] Comparison of percentages based on four-, five-, and six-minute observations:

	Four-minute (240")	Five-minute (300")	Six-minute (360")
1"	0.4%	0.3%	0.3%
10"	4.2	3.3	2.8
30"	12.5	10.0	8.3

Of a total observation period almost all of the different forms of behavior only occupied from 1 to 30 seconds and the percentages based on these small figures have a possible error of ±2.5% when the timing error is as great as one minute.

75"	31.2%	25.0%	20.8%

Only one behavior item in each observation period occupied as many as 75 seconds with a possible error of ±6.0%.

150"	62.5%	50.0%	41.7%

Only one behavior item in each observation period occupied as many as 150 seconds with a possible error of ±12.0%.

of the observer, for other persons who have used the device have found the opposite to be true (125).

2. *Reliability of the Observer in Recording Data (Skill of the Observer).* Three separate types of safeguards were made to insure the reliability of the observer. In the first place, the objective categories of the facial expressive behavior to be recorded prevented erroneous judgments on the part of the observer. Secondly, it was noted in the preliminary investigation, confirming the findings of Hosic (63), that two different types of behavior seldom occurred at the same time in children of this age, so that the recording of their expressive behavior was greatly simplified. In other words, these children smile, talk, or frown, but rarely combine any two. In the third place, the observer was never seen by the children in the majority of the observations. The nursery is equipped with "one-way-vision" screens, and during all the observations made on children in the indoor play room the observer was seated behind one of these (52, p. 61; 51, p. 95).

To offset any criticism which might be made that this use of screens may have prevented the finer, more delicate shades of expression from being seen, the outdoor observations were made differently to check the visibility of these screens. On half of the children (age and sex controlled as far as possible) the outdoor records at the end of the morning were made while the observer was situated among the children in the play yard. The observations on the other half of the children playing outdoors were made by the observer from behind a screen door. For the first half of the children, therefore, the "screen" factor entered into the making of the *indoor* records only; for the rest of the children the "screen" factor was present throughout *all* the observations. Medians were then determined for all the items of behavior as found in all the indoor and all the outdoor records of the first half of the children. Similar medians were determined for the second half also. The indoor medians for the two groups of children were exactly the same and the outdoor medians were practically the same for all the items of behavior, but larger medians for the active expressive behavior forms were found outdoors than indoors in both groups of children. Furthermore, this difference was greater in the second group *where screens had been used* throughout the recording of the observations. The greater expressiveness of the second group outdoors may be a true behavior characteristic of these children or may be due to the fact that the screen was hiding the observer. In either case, the fact remains that when screens were used, as many or perhaps even more shades of expression were observed than when screens were not used. We may assume, therefore, that the use of screens is no impediment to visibility.

In order to check the reliability of the observer, two observers made 15 simultaneous five-minute records. In making these records only one of the pair timed the interval of observation, indicating by a signal the beginning and end of each period. Some error between the total number of second-notations recorded by each of the two observers is to be expected, since it was impossible for both observers to begin and end on exactly the same second. Of the 4456 stop-watch seconds, Observer "*X*" recorded 4441 second-notations and Observer "*Y*" 4463. This makes a total of only 22 second-notations difference between the two observers.

These 15 simultaneous records were then analyzed according to: (*a*) the the agreement between the behavior categories recorded; and (*b*) the total number of second-notations in which the two observers did not agree.

The comparison between the behavior items recorded by both observers for each five-minute interval indicated fairly high agreement. Table 14

TABLE 14

THE NUMBER OF BEHAVIOR CATEGORIES SIMULTANEOUSLY RECORDED BY EACH OF TWO OBSERVERS DURING FIFTEEN OBSERVATIONS

Observations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Categories recorded by both *"X"* & *"Y"*	5	5	7	5	8	6	9	7	5	5	5	10	9	6	7	99
Categories recorded by "*X*" alone		1										1				2
Categories recorded by "Y" alone					1					1	1			1	2	6
																107

indicates this agreement between the two observers for each observation in the total series of 15. For example, in the first simultaneous observation five behavior items were checked with perfect agreement by both, and there were no disagreements; in the second there was perfect agreement as to five, but Observer *"X"* recorded one behavior item not recorded by Observer "Y." Of the 107 categories, 99, or 93 per cent, were recorded with perfect agreement by both observers. Only two were checked by Observer *"X"* and not by Observer *"Y"*; and six by Observer *"Y"* and not by Observer *"X.'* This excellent agreement is especially striking if it is kept in mind that in the 15 observations, 285 possible items of behavior could have been recorded.

When the 15 simultaneous five-minute records were analyzed for disagreement between simultaneous second-notations by the two observers, those seconds in which the symbol "A" occurred in either record were not counted, for this indicated that one or the other was unable to see the activity of the child's face. Only those seconds in which both observers could see the child's face were compared. Table 15 gives the number of

TABLE 15

THE NUMBER OF SECOND-NOTATIONS NOT RECORDED ALIKE BY TWO OBSERVERS FOR FIFTEEN SIMULTANEOUS OBSERVATIONS

Observation,	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Number of second-notations not recorded alike	7	1	28	13	1	15	30	1	10	24	6	4	30	21	7	198

discrepancies in second-notations for each pair of simultaneous five-minute records.

This table indicates that in eight records the two observers disagreed in 10 or less second-notations, in two records the disagreement was between

11 and 20, and in five records there were 21 to 30 second-notations not checked alike. When the 4441 second-notations, in the total 15 observations which the two observers had in common were compared, in only 198 of these was there disagreement between the two observers. This means that in only 4 per cent of the second-notations did one observer disagree with the other.

3. *Reliability or Internal Consistency of the Data (Fluctuations in the Behavior of the Individual).*

As has been the practice of writers on the subject of social behavior, group odd-even rank correlation coefficients were computed from the present results, to check the internal consistency of the data. These coefficients were determined for each of the behavior items for the whole group of subjects. Five out of the 17 behavior items give coefficients over .70 [talking .72; general-facial-activity ("*F*") .73; whimper .84; crying .81; and dramatic-vocalization ("*D*") .90]; only three of the coefficients are below .50 (chuckle .19; frown .12; and sing .44). The coefficients for the rest of the items range between .50 and .70. Wherever comparisons were possible between these correlation coefficients and those of previous investigators, amazingly high correspondences were found in every instance.

In averaging the results in this way, the periodic fluctuations in the behavior of each subject at the six separate observations has been more or less submerged. The closer the correspondence between the mean of each individual odd observation and the mean of each individual even observation, the higher, of course, will be the rank coefficients of correlation between the two groups of means. Since there were insufficient records for any one of the subjects, individual consistency in behavior could not be determined statistically within the limits of this investigation. The fact, however, that decided consistencies and inconsistencies in behavior were noted from observation to observation among the individual members of the group (see Section V) suggests that the group consistency correlation coefficients were probably affected unfavorably by this individual variability in behavior. Furthermore, it must be borne in mind that group consistency correlation coefficients are also affected unfavorably by infrequently occuring behavior items. For this reason greater possibilities were offered for somewhat lower coefficients of correlation in whispering, singing, and crying. These two factors,—individual variability and infrequency in behavior,— suggest that the odd-even correlation coefficients, though fairly low and unreliable, were probably due to an insufficient sample rather than to the technique of recording.

In order to see how small a unit could be used to give predictable results, the scores for the last day's observations were ranked for the group, and coefficients of correlation were found between these and the ranks of the group according to their total scores. These correlations proved to be practically as high as the odd-even consistency correlations discussed above. All of them, however, are above .40, and all but five are above .50. Those between .40 and .50 are: smile .41; chuckle .41; laugh .46; general-facial-activity ("*F*") .43; and frown .47.

In this section an attempt has been made to demonstrate the reliability of the expressive behavior items observed and of the observer in the use of the device. Further discussion is added to the question of reliability in Section V. In that section emphasis is placed upon the individual rather than on the group, because it was found that individual variability was very pronounced and that group results (or the sum of variable individuals) must needs be influenced by such inconsistency.

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